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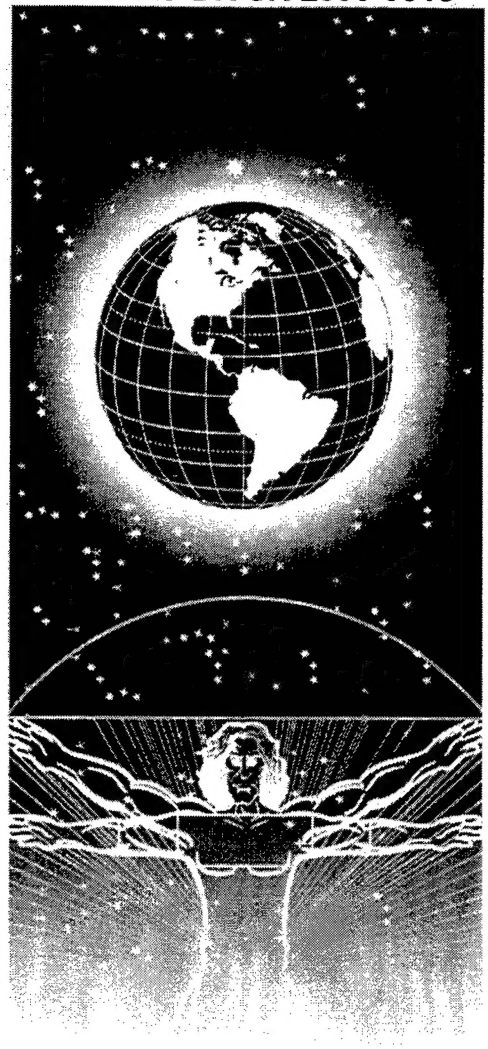

UNITED STATES AIR FORCE
IERA

Update AF-EMIS for Hazardous Material Data Entry – Phases 1 and 2, Andrews Air Force Base, MD

Pacific Environmental Services, Inc.
560 Herndon Parkway, Suite 200
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September 2000

Air Force Institute for Environment, Safety and Occupational Health Risk Analysis
Risk Analysis Directorate
Environmental Analysis Division
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Report provides HAZMAT data to the functional organizations responsible for execution of the HAZMAT Management Process such as Civil Engineering (CE), Bioenvironmental Engineering (BE), Safety (SE), and the Logistics Group (LG).

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ACRONYM AND ABBREVIATION LIST

ACGIH	American Conference of Governmental Industrial Hygienists
AFB	Air Force Base
AF-EMIS	Air Force Environmental Management Information System
AFI	Air Force Instruction
AFOSH	Air Force Occupational Safety and Health
AMC	Air Mobility Command
Avg.	Average
BE	Bioenvironmental Engineering
BEI	Biological Exposure Index
BEF	Bioenvironmental Engineering Flight
BESWPID	Bioenvironmental Engineering Services Workplace Identification Number
BSM	Base Surveillance Manager
CAA	Clean Air Act
CAGE	Commercial and Government Entity
CAS	Chemical Abstract Service
CE	Civil Engineering
CF	Cubic Feet
Cmd.	Command
Conc.	Concentration
COR	Contractor Officer Representative
CSA	Chemical Staging Area
CSA ID	Chemical Staging Area Identification
CY	Cylinder
DESCIM	Defense Environmental Security Corporate Information Management
DOT	Department of Transportation
°F	Degree Fahrenheit
EHS	Environmental Health and Safety
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
g/l	Grams per liter
GOCESS	Government Operated Civil Engineering Supply Store
HAP	Hazardous Air Pollutant
HAZMAT	Hazardous Material
HAZMART	Hazardous Material Pharmacy
Hg	Mercury
HMIS	Hazardous Material Information System
HM POC	Hazardous Material Point of Contact
HW POC	Hazardous Waste Point of Contact
IEX	Issue Exception
Ins.	Installation

ACRONYM AND ABBREVIATION LIST (concluded)

LB	Pounds
lbs/gal	Pounds per gallon
LG	Logistics Group
LPN	Local Purchase Number
Max.	Maximum
mg/m^3	Milligrams per cubic meter
Min.	Minimum
mm	Millimeters
MSDS	Material Safety Data Sheet
MSM	Major Command Surveillance Manager
N/A	Not applicable
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
No.	Number
NSN	National Stock Number
ODC	Ozone Depleting Chemicals
ODS	Ozone Depleting Substance
Ofc.	Office
Org.	Organization
PEL	Permissible Exposure Limit
PES	Pacific Environmental Services, Inc.
Pkg.	Packaging
POC	Point of Contact
PPE	Personal Protective Equipment
ppb	Parts per billion
ppm	Parts per million
Qty.	Quantity
RCRA	Resource Conservation and Recovery Act
RMP	Risk Management Plan
SE	Safety or Chief of Safety
Seq.	Sequential
SOS	Sources of Supply
STEL	Short-Term Exposure Limit
TPM	Technical Program Manager
TLV	Threshold Limit Value
TRI	Toxic Release Inventory
UEC	Unit Environmental Coordinator
VOC	Volatile Organic Compounds

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1.0 INTRODUCTION

1.1 BACKGROUND

Pacific Environmental Services, Inc. (PES) was contracted under Air Force Contract F41624-95-D-9017, Order 57, to enter and validate data in the Air Force Environmental Management Information System (AF-EMIS) at Hazardous Material Pharmacies at Andrews, Charleston, Dover, Fairchild, MacDill, McChord, Scott, and Travis Air Force Bases (AFBs). Air Force Instruction (AFI) 32-7086 Hazardous Materials Management, dated 01 August 1997, requires that bases collect and maintain hazardous material (HAZMAT) data on standardized automated data processing equipment through a Defense Environmental Security Corporate Information Management (DESCIM) program, or a DESCIM-approved interim program. Presently, AF-EMIS is the DESCIM-approved interim program for the Air Mobility Command (AMC). While AF-EMIS is installed at each of the eight AMC bases addressed by this Order, presently its full capabilities cannot be utilized because key data has not been entered into the system. The objective of Order 57 was to correct this deficiency by contracting PES to enter and validate the needed data.

AF-EMIS was developed to provide HAZMAT data to the functional organizations responsible for execution of the HAZMAT Management Process, i.e., Civil Engineering (CE), Bioenvironmental Engineering (BE), Safety (SE), and the Logistics Group (LG). These organizations shall be referred to hereafter as AF-EMIS stakeholders. The HAZMAT data are needed by the organizations to meet their HAZMAT-related reporting requirements; assess pollution prevention opportunities; measure the success in minimizing HAZMAT use; and protect the environmental, safety, and health conditions of workers and the community. Because some of the data fields have not been populated, AF-EMIS cannot be fully utilized for these purposes at the eight bases addressed by this Order. Furthermore, not all sources of supply (SOS) currently have connectivity to AF-

EMIS or have arrangements with another SOS to make the necessary entries into the tracking system, as required by AMC Supplement I to AFI 32-7086.

PES is to determine the status of the AF-EMIS at the eight bases and to populate the tracking system to allow CE, BE, SE, and LG to satisfy their HAZMAT-related data requirements. In performing this work, PES is to enter data from other SOS, as provided and directed by each base. Data entry for the fourth of the eight bases (Andrews AFB) was completed 28 April 2000. This report documents the results of the Andrews AFB effort.

PES conducted a base-specific Kick-off Meeting at Andrews AFB on 29 February 2000 to determine the initial status of AF-EMIS data completeness and quality. PES analyzed and updated the data in the recently issued Version 6.1. In addition, the availability of information and resources to complete data input/validation was discussed with respect to all SOS. The initial AF-EMIS status is summarized in Section 1.3.

Data elements to be entered or verified were established during the base Kick-off Meeting, which was attended by, among others, representatives from CE, BE, LG and SE. A list of the AF-EMIS Materials Module data fields was distributed to each of the Kick-off Meeting attendees. The list also contained a brief description of each data field and the potential sources of data for each data field. This list was discussed in detail during the meeting to establish the data elements to be entered or verified by PES. The data fields that the various Base organizations wanted populated/updated are identified in Section 1.2.

Data entry/validation was conducted at Andrews AFB by a two-person PES team from 29 February 2000 to 28 April 2000. PES' data entry/validation efforts are presented in Sections 2 through 8 of this report.

1.2 AF-EMIS DATA FIELDS TO BE POPULATED/UPDATED

The hazardous material data resides in the "Materials Module" in the AF-EMIS program. This module consists of the following six types of records: National Stock Number (NSN); Shop; Authorization; Commercial and Government Entity (CAGE), which contains information from the MSDS; Chemical Abstract Service (CAS); and Manufacturer. These records contain the following information:

This record:	Stores information on:
NSN	**Hazardous material and waste profiles identified by a National Stock Number or other identifying stock number, such as Local Purchase Number (LPN).**
Shop	**Organizations and work areas where hazardous material is used and waste is accumulated.**
Authorization	**Authorizations for shops to use hazardous material.**
CAGE (MSDS)	**MSDS information on the hazardous material and waste profiles.**
CAS	**Information on the chemicals contained in the hazardous material or hazardous waste streams.**
Manufacturer	**Manufacturers and vendors that supply hazardous material.**

These records were presented to the AF-EMIS stakeholders as the data AF-EMIS Materials Module data fields list. The AF-EMIS stakeholders used this list to identify the data fields to be populated/updated by PES.

Data fields that the Base AF-EMIS stakeholders wanted populated for the six record types are listed in Table 1.1. Those data fields appearing in bold for each record are the mandatory data that must be entered in order for the AF-EMIS program to create that record. For example, AF-EMIS will not create a NSN record if the NSN, Components in NSN, Noun, Supply, or Shelf Life fields are not populated.

Table 1.1. AF-EMIS Data Fields that Andrews AFB Personnel Desired PES to Populate

Records	Data Field
NSN	**NSN** **Components in NSN** **Noun** Status Specification Break NSN Break Qty Size Unit Pkg. **Supply** Seq. Tracking Type Material Aerosol EPA 17 and ODS Empty Container Regulated Outside Container VOC % Min. (automatically calculated) VOC % Max. (automatically calculated) Health Review Code IEX Code Physical Hazard Hazard Characteristic Code **Shelf Life** Remarks
Shop	None
Authorization	**Type of Use** **End Date** **Shop Code** Contractor Shop Supply Account Codes **NSN** **Draw Amount** **Draw Frequency** Sole Source Requirement Sole Source CAGE Justification - Weapon System

Table 1.1 (Continued)	
Records	**Data Field**
Authorization (continued)	**Justification - Justification (Tech. Order)** **Justification - Requiring Document** Justification - Page Number Justification - Para. Number Justification - Date Justification - Revision Justification - Remarks New Process? New Material? Authorization Replace Another? ID for Replaced Authorization Authorization Replacement Reason **Process Code** **Task Description** **Task Duration with Units** **Task Frequency with Units** **Amount of Material Used per Task with Units** **Material Application Method** **PPE Type** **Personal Protective Equipment (PPE)** PPE Remarks **PPE - Respirator Manufacturer (Required with Respirator Only)** **PPE - Respirator Model (Required with Respirator Only)** **PPE - Respirator Cartridge Type (Required with Respirator Only)** PPE - Respirator TC Number **Is Process Performed in Facility, Aircraft, or Other Structure?** **Is Process Performed Outdoors?** **Is the Process in a Small or Restricted Space?** **Is the Process Performed in a Confined Space?** **Will the Process be Performed in a Location Other Than the Shop?** Description of the Process Location (Building Number, etc.) Where Will Any Unused Material Be Stored?

Table 1.1 (Continued)	
Records	**Data Field**
Authorization (continued)	**Industrial Equipment Use** Equipment Type Equipment Number Material Transfer Method **Is Material Mixed?** **Material Mixing Method** **Is Material Heated?** **Material Heating Method** Heated Material Temperature Min., Max., and Units **Material Abrasion Method** Is Material Pressurized? Material Pressurization Method Material Pressure Min., Max., and Units Are Engineering Controls in Use? Engineering Control Type **Waste Handling Method** **Name of Requestor** **Request Data** **Is Authorization Request Certified?** **Name of Certifier** **Certified Date** Certifier Remarks **Next Action** **Date Next Action** **Health Review Status** Health Review Remarks (General) Health Review Remarks (Canned) **Health Review Date** **Health Review Person** **Safety Review Status** Safety Review Remarks (General) Safety Review Remarks (Canned) **Safety Review Date** **Safety Review Person** **Environmental Management (EM) Review Status** EM Review Remarks (General) EM Review Remarks (Canned) **EM Review Date** **EM Review Person**

Table 1.1 (Continued)	
Records	**Data Field**
CAGE (MSDS)	**NSN** **CAGE** CAGE Status **CAGE Version** **CAGE Component No.** Part No. or Trade Name DOT Shipping Name DOT Packaging Group MSDS Date Health Review Health Hazard Physical Hazard **Ounces** **Type** Density Specific Gravity Flash Point Type, Min., and Max Vapor Pressure with Units pH Type, Min., and Max. VOC with Units Storage Pressure Storage Temperature Container Type Chemical Form Remarks Constituents – CAS Constituents – Chemical Name Constituents – Amount Min. and Max. Constituents – Concentration Units Constituents – Percent Weight or Volume Constituents – Hazardous Ingredient Constituents – EPCRA Physical State Constituents - TRI Qualifier
CAS	None

Table 1.1 (Concluded)	
Records	**Data Field**
Manufacturer	**CAGE** **Status** Distributor **Company Name** Address City County State Country Zip Phone Fax

1.3 INITIAL AF-EMIS STATUS

A limited assessment of the status of the data already entered into the AF-EMIS system was made with Base AF-EMIS Stakeholders during the Base-specific Kick-off Meeting. PES also perused the database master reports for this purpose. However, only through entering and validating the data was PES able to develop a full understanding of the database condition.

In examining the status of the Andrews AFB AF-EMIS database, PES found approximately 3,800 Authorization records for about 2,247 HAZMAT items. However, Inventory Records indicated that only 302 of these HAZMAT items were issued in the past two years (March 1998 to March 2000). Upon further investigation, PES found that there were no records of issues prior to approximately June 1998. Discussions with Base personnel indicated that materials were issued prior to June 1998 (up to three years prior) but these issue records are not appearing in AF-EMIS. Further discussions with the AF-EMIS Help Desk indicated that material issue records should not disappear. It could not be ascertained as to why the records were not appearing in AF-EMIS. Although the exact fate of these past records could not be ascertained, PES believed that it would have no impact on data to be input/validated by PES. However, PES does recommend that the Base periodically check historical data to assure that no additional data disappears.

Approximately one-half of the data fields in the NSN records populated by PES were initially correct. Also, an additional ten percent of the total records updated were completely input by PES due to changes in NSNs. Typically, this was due to the replacement of an authorized NSN by another NSN that was not loaded into AF-EMIS. Fedlog provided data on such replacements.

The 3,800 Authorization records in AF-EMIS were not populated completely since the Base had recently upgraded Version 5.1 of AF-EMIS to Version 6.1

and the Authorization record for Version 6.1 requires significantly more information than the Version 5.1 AF-EMIS Authorization record. Base personnel were made aware of this data deficiency and decided to implement the new version of the Form 3952, which contains all data needed for AF-EMIS Version 6.1, over time. Therefore, the PES data entry team would focus on 285 recently obtained Form 3952s that were not entered into AF-EMIS (not included in the 3,800 records). Although these Form 3952s were not the most recent, they did contain some of the information as the new Form 3952.

While most of the NSN records had at least one associated CAGE (MSDS) record, many had multiple CAGE records. This posed an unmanageable quantity of data entry/validation to be performed. To reduce the data entry effort to a more manageable level, mutual agreement was reached between the BSM, MSM, TPM and PES to limit the CAGE record(s) for populating/updating to those associated with HAZMAT that were in the electronic inventory in the AF-EMIS Staging Area Module and those that had hard copy MSDS's attached to the Form 3952. If no HAZMAT with the NSN/LPN were in inventory and if no hard copy MSDS were attached to the Form 3952, the most recent MSDS based on the MSDS date listed in the Hazardous Material Information System (HMIS) database was used. PES found that the number of CAGE records populated/validated to be approximately 1.2 times the number of different NSNs and LPNs authorized for shop use. CAGE records that were already in AF-EMIS before PES began data entry, but no longer active (i.e., the associated HAZMAT was not issued in the past two years or the record did not reflect the latest MSDS) were assigned proper sizes (Ounces and Type) and inactivated. CAGE records associated with NSN records that were not issued in the past were assigned near zero ounces and inactivated. Additional details on this subject are presented in Section 6.

About one half of the final number of Manufacturer records required updating to some degree. Most updates were minor such as changes in office location or area codes for phone/fax numbers.

PES did not update CAS records because they were updated with the new AF-EMIS Version 6.1, which was recently installed at Andrews AFB. Version 6.1 contains updated CAS records, including some new fields.

PES updated/validated only the Process Code and Descripton fields of the Shop records because most of the other shop record data fields are not vital to the tracking of HAZMAT usage in each shop. The only truly vital fields are the shop code and the process code. Both fields were validated for shops where Authorization records were updated. However, the Process Code and Description data requires routine updating any time the process for an authorized material is revised.

Due to the amount of NSN and Authorization records, PES used the following strategy for data input/validation. First, PES updated the NSN, Manufacturer and CAGE records associated with the 302 HAZMAT items that were issued in the past two years. Upon completion, PES loaded Authorization records for the Form 3952s that were not entered into AF-EMIS. Afterwards, PES updated NSN, Manufacturer and CAGE records for as many HAZMAT items as possible within the eight-week time frame, focussing on HAZMAT for the larger shops that use the greatest amount of HAZMAT.

1.4 OVERVIEW OF DATA ENTRY/VALIDATION PROCEDURES

The population of the six hazardous material records must be performed in the following order: Shop, NSN, Manufacturer, CAS, CAGE, and Authorization. Procedures used by PES for each record are described in Sections 2 through 7, with each section devoted to a particular type of record. The data fields, including the data sources, difficulties encountered, and conventions for a specific type of record are discussed in each section. Included in each section is a table that lists each data field; identifies sources of information used to

populate each field; and enumerates data entries made by PES. The AF-EMIS record screen is also presented for each record type.

PES populated/validated AF-EMIS records noted in Section 1.3. However, PES entered data for a HAZMAT only if there was a hard copy Form 3952/Add Authorization Request Worksheet, authorizing its use on Base. The Order's Statement of Work did not include the capture of HAZMAT in the AF-EMIS database if this material were not being acquired, stored, etc. in accordance with the HAZMAT management process authorization procedures.

Shops requiring the use of HAZMAT are required to submit a Form 3952 prior to obtaining such materials. An AF-EMIS developed form, the Add Authorization Request Worksheet, contains the same information as a Form 3952, however, it is presented in a more user-friendly format that allows for easy data entry into AF-EMIS. The Form 3952 is deemed approved when it has been reviewed and signed by appropriate BE, CE, and SE representatives. The HAZMART will not issue HAZMAT to a shop that has not followed the Form 3952 process.

2.0 SHOP RECORD DATA ENTRY/VALIDATION PROCEDURES

AF-EMIS has three Shop record screens including the Shop Certifier List; these are presented as Figures 2.1 through 2.3. PES used information from the Form 3952 for the shops to populate the Shop records following the procedures described below.

Shop records must be entered/validated first because each material authorization is specific to the processes in a particular shop. The Authorization record cannot be created in AF-EMIS if the shop and process codes do not already exist in the database. Shop records were created by Base personnel prior to PES' arrival for all shops at Andrews AFB.

As previously mentioned, PES entered or validated only the Process Code and Description data field of the Shop records. PES' data entry procedures/activities for this data field of the Shop record is described in the following paragraph.

Process Code and Description. The process code is a four character code (two-letters followed by two numbers) that indicates the process operations that occur in the shop, such as industrial soldering. These fields were validated for each shop based on information from the Form 3952 for that shop. All of the Shops for which PES updated NSN, CAGE or Authorization records required no changes to the Process Code and Description data field.

FIGURE 2.1
AF-EMIS SHOP RECORD SCREEN NUMBER 1 OF 3

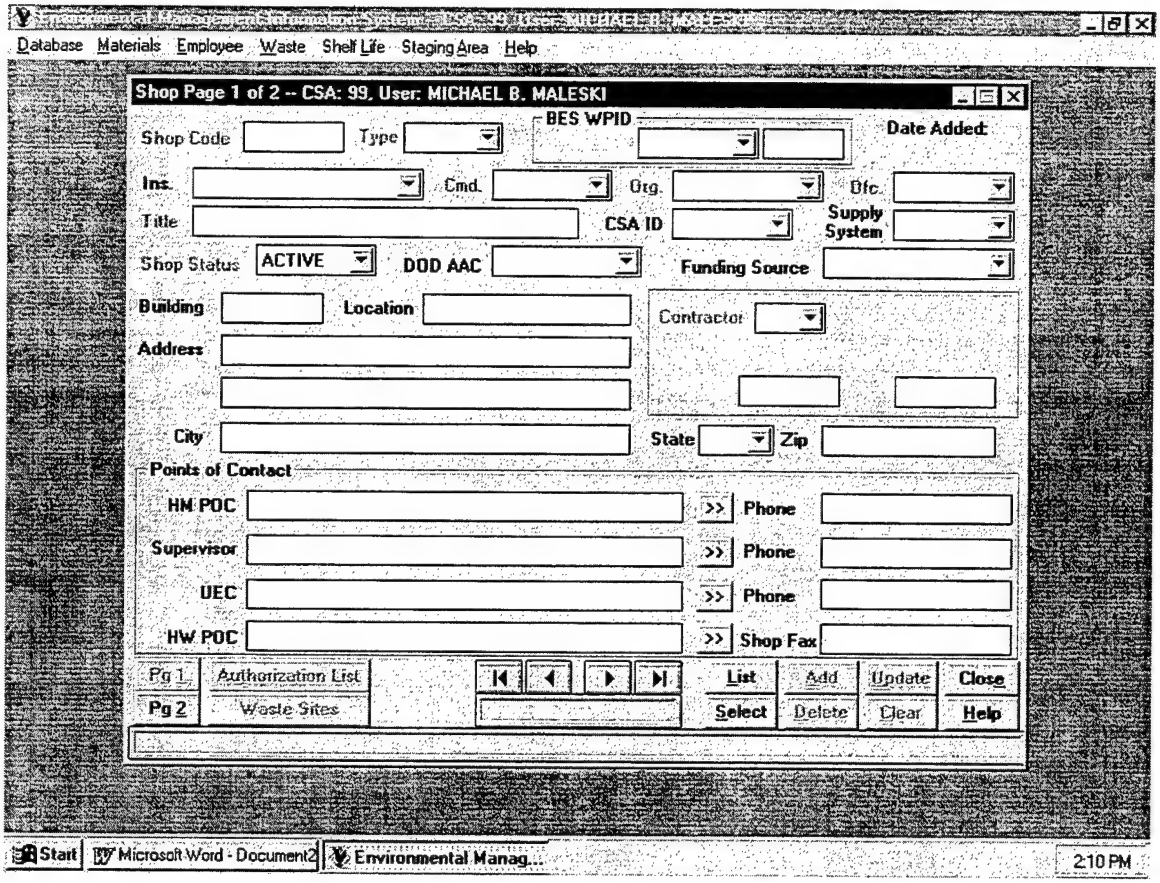


FIGURE 2.2
AF-EMIS SHOP RECORD SCREEN NUMBER 2 OF 3

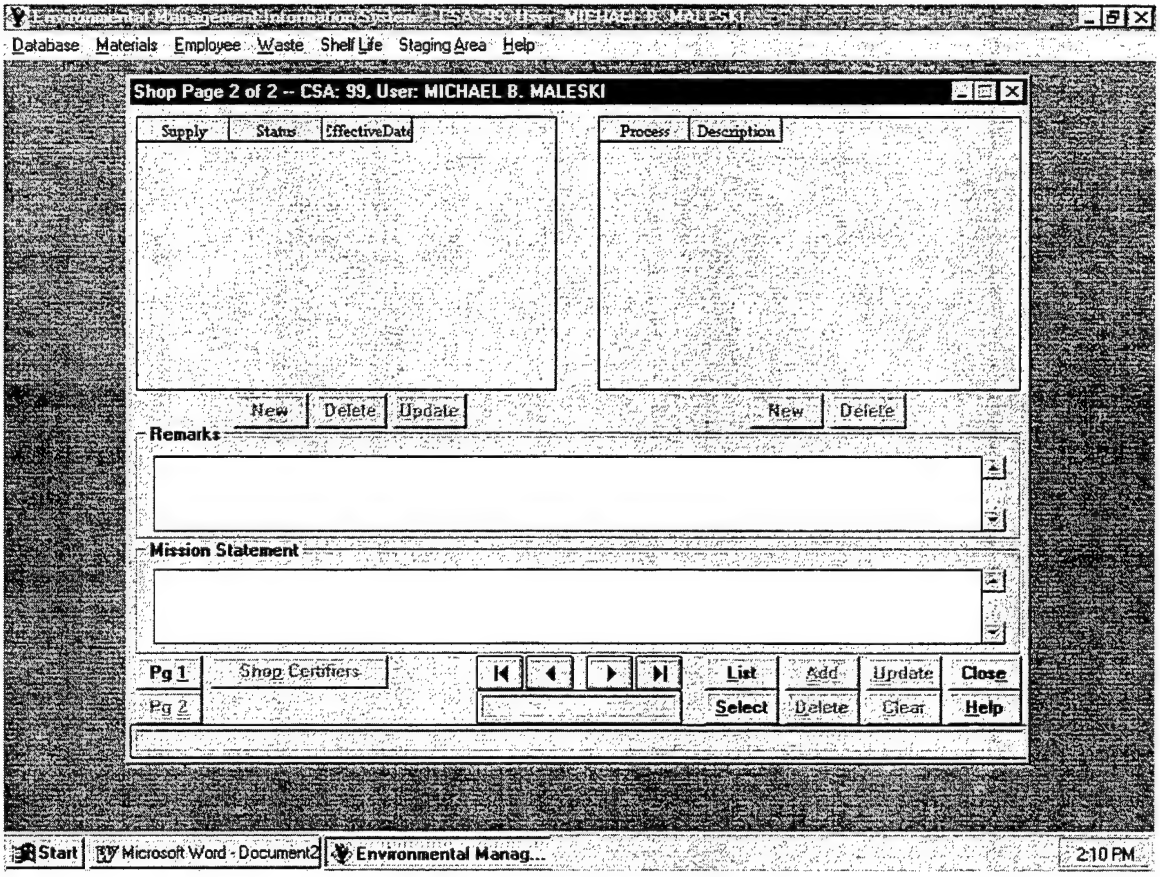
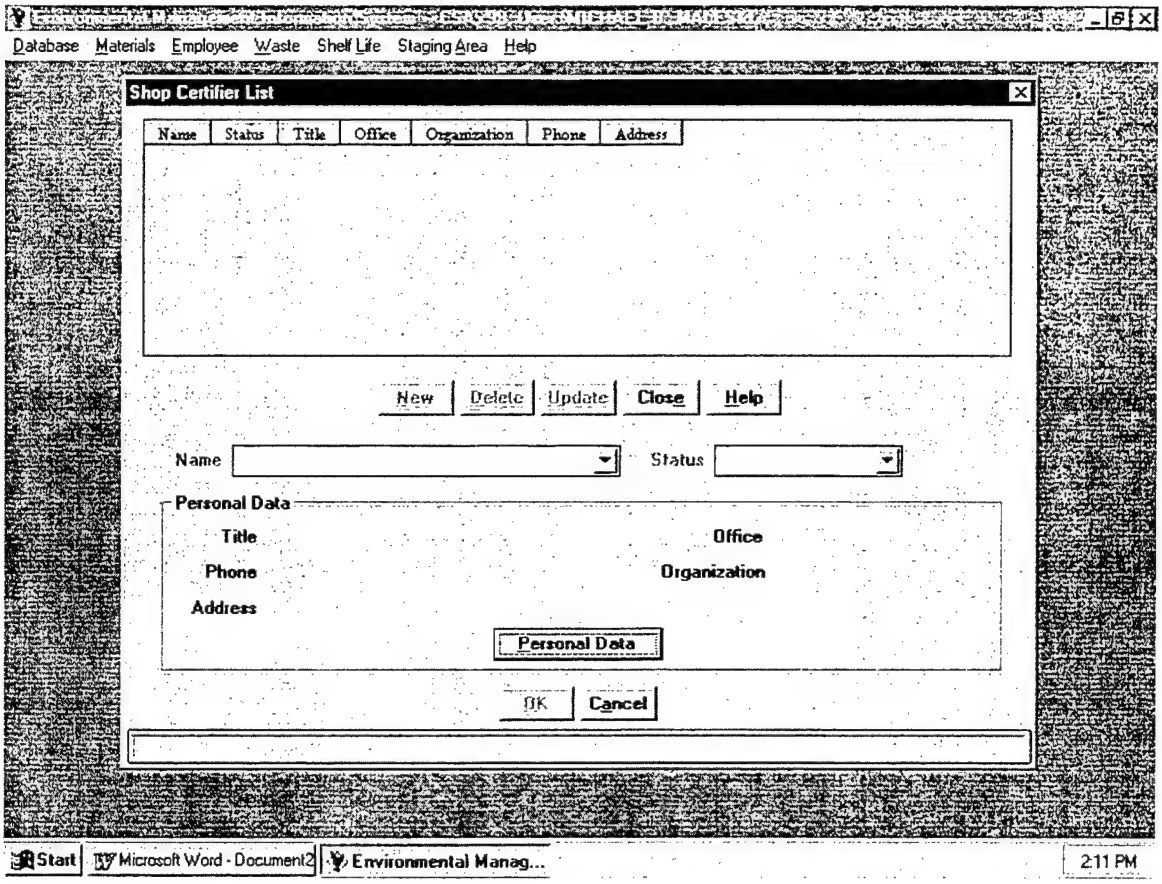


FIGURE 2.3
AF-EMIS SHOP RECORD SCREEN NUMBER 3 OF 3



3.0 NSN RECORD DATA ENTY/VALIDATION PROCEDURES

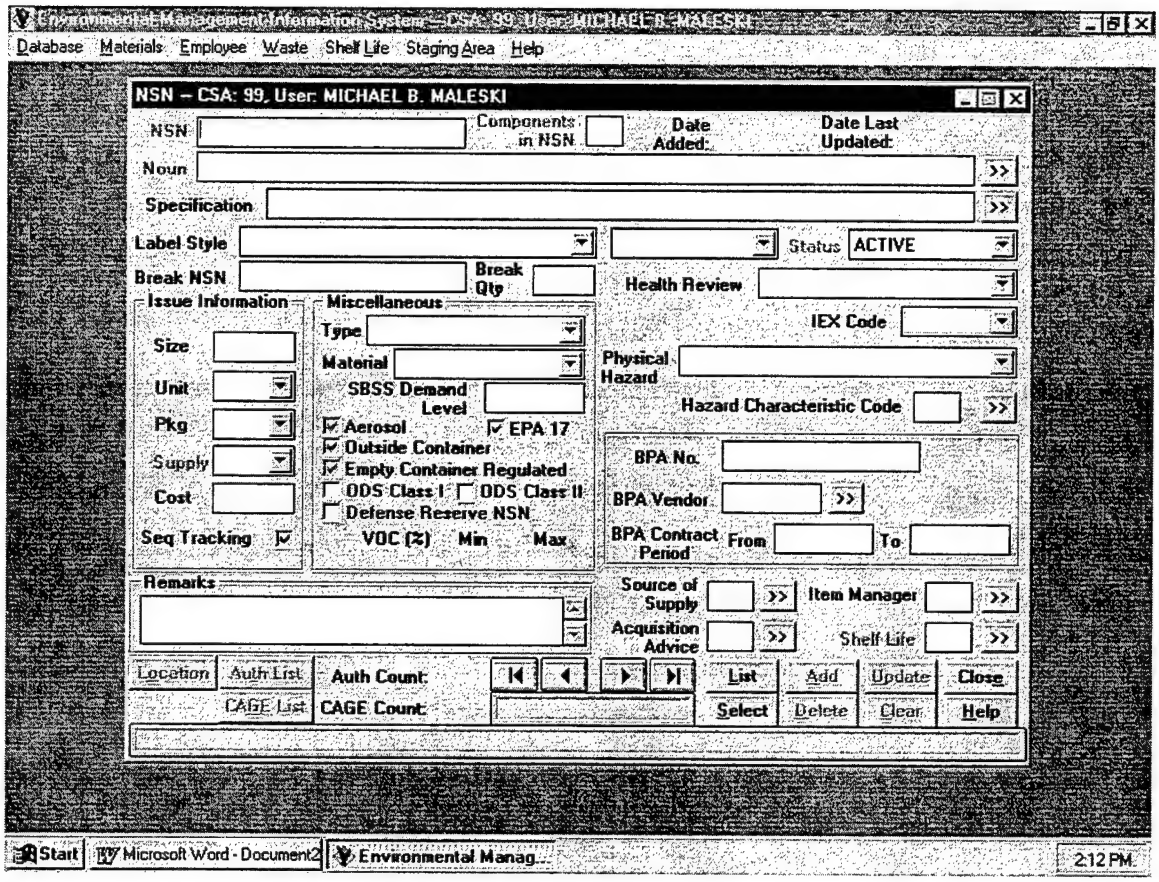
The sources of information needed to enter/validate the data fields that Base AF-EMIS stakeholders wanted populated were as follows: Form 3952, Fedlog database, and MSDS (or Hazardous Material Information System (HMIS) if a MSDS were not available). The NSN record data fields; the sources of information used to populate these fields; and the number of times PES entered data for each data field are listed in Table 3.1. The AF-EMIS NSN record screen is included as Figure 3.1.

The first step for entering NSN record information was to select valid CAGE(s) (MSDS) to serve as the information basis for the data fields. The CAGE(s) were initially selected based on the presence of the associated HAZMAT in the AF-EMIS inventory module, and hence being stored in the HAZMART at the time of the record update. If the material from one or more suppliers was in the inventory, the corresponding CAGE(s) was/were used. In addition, the CAGE(s) associated with any MSDS(s) attached to the Form 3952s were also selected. If none of this material were in inventory and no MSDS was attached to the Form 3952, the CAGE with the most recent MSDS preparation and evaluation dates located in the General Information section of HMIS was selected. Typically, the most recent MSDS preparation date was used; however, an older MSDS was used if it were evaluated far more recently.

Another consideration in the CAGE selection was whether manufacturer information existed. If HMIS/MSDS did not have sufficient or valid manufacturer information for a CAGE, Fedlog was checked. If the CAGE did not exist in Fedlog (likely for CAGEs consisting of five letters), another CAGE was chosen; however, this was extremely rare.

Table 3.1. NSN Record Data Fields with Sources of Information and Number of PES Entries		
Data Field	**Source of Information**	**Number of PES Entries**
NSN	Form 3952	249
Components in NSN	Fedlog / HMIS	285
Noun	Fedlog / HMIS / 3952	253
Specification	Fedlog / HMIS / 3952	326
Break NSN	Fedlog / HMIS / 3952	28
Break Qty	Fedlog / HMIS / 3952	28
Size	Fedlog / HMIS / 3952	815
Unit	Fedlog / HMIS / 3952	802
Pkg.	Fedlog / HMIS / 3952	722
Supply	Fedlog / HMIS / 3952	322
Seq. Tracking	Fedlog	1,175
Type	Fedlog / HMIS / 3952	943
Material	Fedlog / HMIS / 3952	935
Aerosol	Fedlog / HMIS / 3952	120
EPA 17	All Entered as "No"	539
ODS (automatically populated)	Not Applicable	N/A
Empty Container Regulated	All Entered as "Yes"	1,276
Outside Container	Fedlog / HMIS / 3952	603
VOC %Min (automatically calculated)	Not Applicable	N/A
VOC %Max (automatically calculated)	Not Applicable	N/A
Health Review Code	HMIS	573
IEX Code	HMIS	730
Physical Hazard	HMIS / MSDS	1,084
Hazard Characteristic Code	HMID / MSDS	761
Shelf Life	Fedlog	325
Remarks	Fedlog/PES	53

FIGURE 3.1
AF-EMIS NSN RECORD SCREEN



PES completely updated/validated all NSN Records for the hazardous materials issued during the past two years (302), plus an additional 1,019 NSN Records that were in the database for materials with no AF-EMIS issuance record. There were 926 NSN Records not fully updated for various reasons as follows: Twenty-four materials required the size of the issued container since Fedlog, HMIS, an MSDS or a Form 3952 did not identify the correct size of the issued container. There were 13 materials that did not have a MSDS; therefore, the physical hazard could not be verified versus the MSDS. Fifty-six NSN records were inactivated since the NSN was replaced by another NSN. Eight other HAZMAT items did not have a NSN assigned; therefore, no NSN record could be located or loaded. The remaining 825 NSN records were not updated/validated because there was no Form 3952 on file (approximately 27%) or the eight-week data entry period expired (approximately 73%).

Once a CAGE was chosen for the NSN/LPN, all data fields were populated or validated as described in the following paragraphs.

NSN. The NSN for a stock or local purchase item was obtained from its Form 3952; however, several scenarios required that the NSN entered into AF-EMIS differ from the value listed on the Form 3952. One such scenario is related to the AF-EMIS "Break Open" feature. The supply unit of issue in the management and characteristics sections of Fedlog may indicate that the item is received by the HAZMART in bulk. If this is known to be the case, the "Break Open" feature in AF-EMIS must be used. This allows for the issue and tracking of material that is ordered in bulk, but can be either delivered as bulk (e.g., a box of 12 cans of spray paint) or as individual issues (e.g., one can of spray paint). The base NSN is for the bulk item. Another NSN, commonly referred to as "dash one NSN" because it is formed by adding a "-1" to the end of the base NSN, is created as the AF-EMIS identification number for sequential tracking of the individual units from a bulk package. The "dash one NSN" is also referred to as a "Break NSN".

PES entered data for 28 "Break" NSN records created in the database. The majority of these records involved boxes of paint, cleaner, oil, or insect repellant.

Another scenario that required a change to the NSN entered into AF-EMIS from the Form 3952 occurred when Fedlog showed that the authorized NSN had been replaced. For this scenario, the status of the pre-existing (i.e., before PES' data entry activities) NSN record status was changed to "replaced" and a remark was added discussing the replacement of this NSN record. A new NSN record was created (or if the new NSN existed in AF-EMIS, that record was updated), based on the new Fedlog data and appropriate CAGES.

Components in NSN. This data field represents the number of components, or parts, in a single NSN and was obtained by PES from either the characteristics section of Fedlog or in HMIS (typically in the Part Number/Trade Name). For most materials, such as oil, the value is one; however, some materials are multi-part kits, such as an epoxy adhesive.

Noun. The Noun is the nomenclature associated with a NSN. In AF-EMIS, it must be chosen from a pull-down list pre-loaded in the software by the Air Force. Typically, the correct Noun was available from the pull-down list for the NSN, but it was validated and occasionally changed based on information from Fedlog or HMIS/MSDS/Form 3952 for local purchases. If the required Noun did not exist in the pull-down list, it was added to the list using the AF-EMIS systems administration module.

Specification. This pick-list data field represents the military, federal, commercial or other specification to which the NSN conforms. Typically, both Fedlog, the Form 3952 and HMIS provide this data field for nationally procured items. The specification was never found for LPNs; therefore, the pick-list option "No Specification" was selected.

Status. The Status of a NSN record was always entered as "active" unless the material was not authorized for use by any shop on Base. For instance, if a material was replaced (see discussion under NSN above), the Status was assigned "Replaced".

Break NSN. This data field was used for bulk materials when using the Break Open feature of AF-EMIS. See discussion under NSN above on when to use this feature. The Break NSN was entered in the base NSN record; this data field is left blank in the Break NSN (dash one) record. Also note that the Break NSN record must be created before this data field can be populated in the base NSN record.

Break Qty. This data field represents the number of individual items indicated within the base NSN (from which the "dash one NSN" was created), such as 12 cans of paint in a box. As was the case for the Break NSN data field, it was used when the Break Open feature was required and could not be populated until the Break NSN record was created.

Size. This data field gives the quantity of HAZMAT shipped in the container provided by the supplier. The management and characteristics sections of Fedlog, general information section of HMIS, or the Form 3952 indicated the appropriate Size for a given NSN. When PES began the data entry, the size data field for all NSN records was typically either empty or was incorrectly populated with packaging information (e.g., box or bottle) rather than HAZMAT size units of measurements. PES updated these fields to mass (e.g., pounds) or volumetric (e.g., gallons) units using data from Fedlog.

Size information for local purchases was typically based on the Form 3952 for each material as Fedlog was not available for local purchases and HMIS records or MSDSs rarely listed such data for these items. If the Form 3952 did not include sufficient data, the Size was based on typical quantities for similar

materials. For example, the typical size for spray paint was one pint. If a typical quantity did not exist for some HAZMAT, PES did not populate the size related data fields and requested the size of these materials from LG personnel. Overall, there were 24 materials that were in need of container sizes.

Unit. The Unit represents the stock item's mass or volumetric unit of measurement within the package specified by the NSN; it was chosen from a pull-down menu. The management and characteristics sections of Fedlog or general information section of HMIS indicated the Unit for each NSN. Most of the Unit data entered into the AF-EMIS database before PES started its data entry was found to be incorrect and was changed to the right values of pounds or gallons.

Pkg. This data field is the packaging specific to the NSN. The management and characteristics sections of Fedlog or general information section of HMIS give the packaging for each NSN. In AF-EMIS, it was chosen from a pull-down menu, which provided the same choices as Unit; however, this field was not the same as Unit. Instead of mass or volumetric units of measurement, the packaging is the physical container for the material, such as a bottle, can, box, roll, cylinder, drum, etc. This data field had to be updated for about one-half of the NSN records.

Supply. This data field is used for identifying the unit of issue that the supply system uses when ordering a material and is obtained from the management section of Fedlog. This field rarely required updating as the pre-existing Supply data was typically correct.

Seq. Tracking. This data field enables the sequential tracking feature in AF-EMIS and is locally established through the use of a three way check box. The box is checked "yes" (indicated by an "X" in the box) for all materials. The

second and third options, which were never used, was "no" (indicated by an empty, non-shaded box) and "unknown", indicated by an empty, shaded box.

Type. The Type data field represents the type of container the material is packaged in, such as can, box, bottle, etc. It was chosen from a pull-down menu and matched the Pkg. data field. If none of the choices in the pull-down menu match the Pkg. field, "other" was selected (typical for unusual packages such as rolls of solder). Also, for a NSN record that had a Break NSN, the Type data field for the base NSN reflected the individual units' container, not the package containing the individual units (i.e., the bulk package). This data field was populated for all NSN records.

Material. The container material of construction (i.e., glass, metal, plastic, or cardboard) is entered in the Material data field. As is the case with the Type data field, it was limited to the options in a pull-down menu and did not represent the outside container of the original NSN when the Break Open feature was utilized. This field was also populated for nearly all NSN records.

Aerosol. The Aerosol data field is a three-way check box with yes, no and unknown options. If the characteristics section of Fedlog or the constituents in HMIS indicates that the material is an aerosol, the box was toggled to contain an "X"; otherwise the box was left empty and non-shaded. In the pre-existing database (prior to PES' efforts), this data field was rarely checked with an "X" regardless of whether it was an aerosol or not.

EPA 17. This three-way check box indicates the possible presence of an EPA-17 regulated chemical within the material. Because there may be multiple CAGEs with different constituents for a given NSN, this data field does not indicate that the HAZMAT corresponding to the NSN does in fact contain an EPA 17 chemical. It only indicates that at least one supplier of the HAZMAT includes an ingredient that is an EPA 17 chemical. Because it has no bearing on EPA-17

related calculations, this data field was populated to indicate "no" EPA 17. This decision was made jointly by PES and representatives from BE and CE.

ODS. Similar to the EPA 17 data field, ODS indicates, through the use of a three-way check box, the possible presence of an ozone depleting substance. This data field was changed from AF-EMIS Version 5.1. The old version of this data field was designed in the same fashion as the EPA 17 Data Field discussed above, i.e., it is manually populated and indicates the potential presence of an ODS in a manufacturer's formulation of the given material. The new Version 6.0 of AF-EMIS retains the meaning of the data field; however, it is automatically populated by AF-EMIS based on the CAS Records associated with the constituents of the CAGE Records associated with the NSN Record.

Outside Container. This data field indicates that the material is contained within an outside container through the use of a three way check box. The box was checked "yes" if an outside container were used, such as for bulk materials when the Break Open feature of AF-EMIS (i.e., box of metal cans containing paint) was used. Otherwise, the box was checked "no". The third option, which was never used, is "unknown", indicated by an empty, shaded box. PES changed the "unknown" for many of the NSN records to "no" or "yes" as appropriate.

VOC (%) Avg., Min., and Max. These data fields represent the average, minimum, and maximum percent by weight concentration of volatile organic compounds. This information is AF-EMIS-generated based on information entered in the associated CAGE record(s).

Health Review and IEX Code. The Health Review data field is based on the Issue Exception (IEX) Code. These data fields were populated based on information from the Form 3952. If the Form 3952 did not include this information and the Health Review and IEX Code data fields were already populated, they were left unchanged. If one was populated, the other field was

assigned the matching value (both fields showed the IEX Code). If no information was in AF-EMIS or the Form 3952, IEX8 was input into both fields.

Physical Hazard and Hazard Characteristic Code. The Physical Hazard data field represents the physical hazards associated with the material. A pull-down menu provides a set number of choices. This data field was populated/verified in conjunction with the Hazard Characteristic Code data field. In the general information section of HMIS, the hazard characteristic code, if available, is given by a code consisting of one letter followed by one number, such as F1. This code is the same code as the Hazard Characteristic Code in AF-EMIS; the associated pick-list shows each code along with a description of that code. This description corresponds to the options in the Physical Hazard data field.

There were three situations for which the exact code and description given in HMIS was not used to populate this data field in AF-EMIS. The first situation was when HMIS showed a hazard characteristic code of "N1", the corresponding description in the AF-EMIS Hazard Characteristic Code was "Nonhazardous Material". Because this option does not exist under Physical Hazard, "No Specific Hazard" was used instead.

Another situation was when HMIS did not list a hazard characteristic code. When this occurred, the transportation data section of HMIS, which occasionally describes the physical hazards associated with the material, was checked. For this situation, the Hazard Characteristic Code was left blank and the option under Physical Hazard that best fit the description given in HMIS was selected.

The last situation was when HMIS did not list a hazard characteristic code or informative transportation data for the HAZMAT. When this occurred, the Hazard Characteristic Code was left blank and "No Specific Data" was chosen from the pull-down menu under Physical Hazard. The Physical Hazard data field was populated or updated for virtually all NSN records.

For a manufacturer MSDS, the physical hazard was obtained by searching the entire MSDS for data that would indicate the physical hazard of the material. Typically, the transportation data section or hazard identification section would indicate any physical hazards.

Shelf Life. This data field represents the amount of time, selected via a pick-list, a material can remain unused in storage before it must be tested, disposed, or reconditioned. Typically, Shelf Life did not need to be updated for NSNs; however, the shelf life for local purchases was often entered as "unknown" because the information was not available (no Fedlog information for local purchases).

Remarks. This data field was used, when needed, to provide additional information that is not included in any of the other NSN record data fields. PES used this data field to show that NSN records (which the status is now set to "Replaced") were replaced by another NSN record, per Fedlog.

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4.0 MANUFACTURER RECORD DATA ENTRY/VALIDATION PROCEDURES

Manufacturer records were updated/validated using both HMIS/MSDS and Fedlog. HMIS/MSDS was used to provide search information in retrieving data in Fedlog, which was typically more up-to-date. Many of the most recent MSDSs for products were several years old; however, Fedlog is updated monthly with more recent information.

Once the NSN record was updated, the Manufacturer record was populated next. It is necessary to populate the Manufacturer record before the CAGE record because the latter cannot be created unless the CAGE data field in the Manufacturer records has been entered into the AF-EMIS database.

While the Manufacturer records are not directly connected to NSN records, they are indirectly linked via the CAGE record. Once a Manufacturer record for a given CAGE has been updated, it did not need to be updated again if the same CAGE were used for a different NSN record. For instance, if one manufacturer (CAGE) makes ten different colors of spray paint (each color would have a different NSN record), the Manufacturer record only needed to be updated one time. For this data entry/validation task, PES determined if a Manufacturer record needed updating by inspecting the system-generated Date Last Updated data field. If this date was before the PES data entry team arrived onsite, the record needed to be updated.

Also, when a CAGE record is imported from HMIS, manufacturer information is imported as well. If the manufacturer data were updated using Fedlog before the CAGE record were imported from HMIS, the Fedlog-based data (which reflects the most recent information) is overwritten with the older data from HMIS. There are two approaches for avoiding this problem. One approach is not to use the electronic HMIS import feature; data needed from HMIS is manually transferred

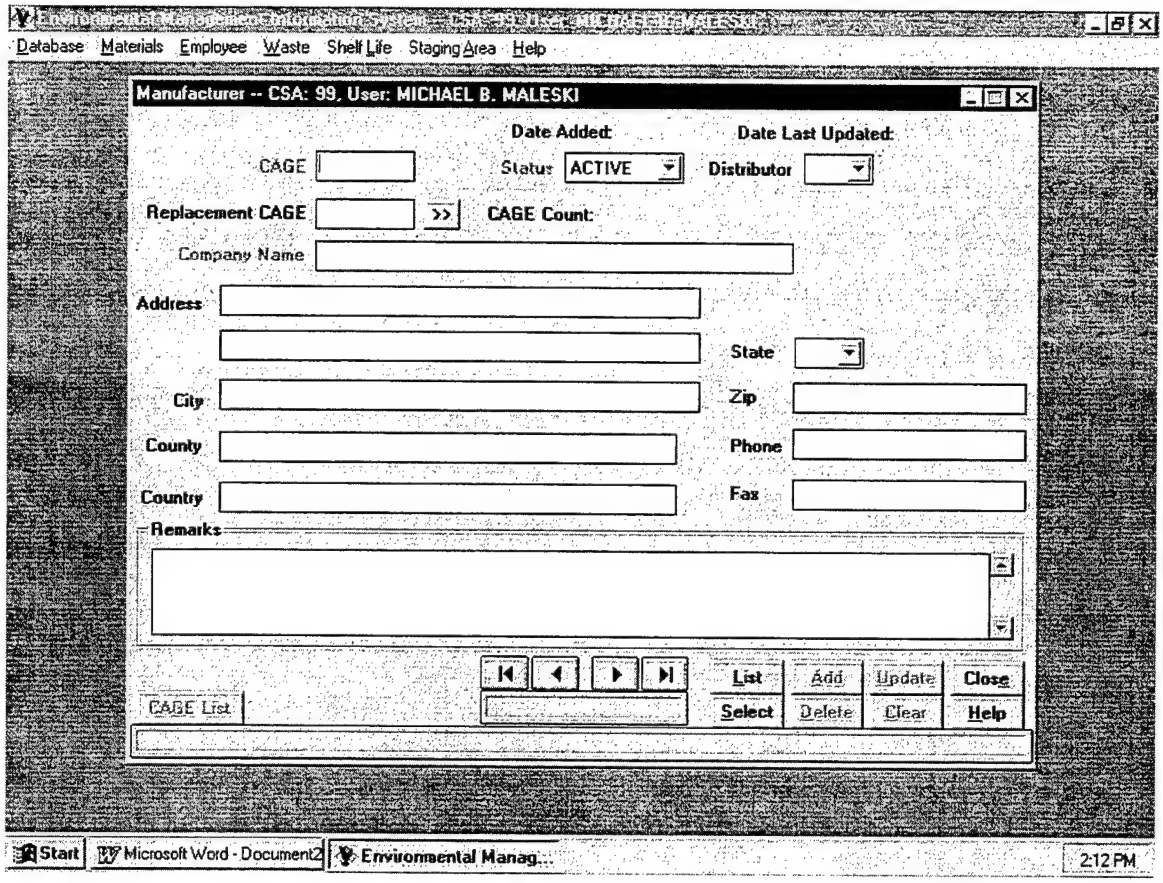
to AF-EMIS. The other approach is to verify that the manufacturer CAGE has been entered in the NSN record, import the CAGE record electronically from HMIS, and then enter/validate the Manufacturer record. PES utilized the first approach.

Table 4.1 lists the Manufacturer data fields that the Base AF-EMIS stakeholders wanted populated; the associated sources of information PES used to populate them; and the number of times data were entered for each data field. The AF-EMIS Manufacturer record screen is presented as Figure 4.1. Much of the Manufacturer record data had already been pre-loaded by the AF-EMIS software developer before PES arrived onsite and the entered data were typically correct. Data entry/validation by PES was fairly straightforward.

Table 4.1. Manufacturer Record Data Fields With Sources of Information and Number of PES Entries

Data Field	Source of Information	Number of PES Entries
CAGE	AF-EMIS Inventory Module / HMIS	119
Status	See Discussion	117
Distributor	See Discussion	131
Company Name	Fedlog / HMIS / MSDS	184
Address	Fedlog / HMIS / MSDS	305
City	Fedlog / HMIS / MSDS	194
County	Fedlog / HMIS / MSDS	0
State	Fedlog / HMIS / MSDS	148
Country	Fedlog / HMIS / MSDS	146
Zip	Fedlog / HMIS / MSDS	328
Phone	Fedlog / HMIS / MSDS	344
Fax	Fedlog / HMIS / MSDS	131

FIGURE 4.1
AF-EMIS MANUFACTURER RECORD SCREEN



CAGE. This data field is the HAZMAT vendor's Commercial and Government Entity (CAGE). The majority of the CAGE data fields had already been entered into the AF-EMIS database by the Logistics Group before PES began its data entry. Only 119 CAGEs needed to be entered, which brought the total number of CAGE data fields populated/validated to 649.

Status. For all Manufacturer records associated with a CAGE chosen for use in the NSN record, the Status was "Active". The other Manufacturer records were left unchanged.

Distributor. This data field identifies if the manufacturer is a distributor, as indicated by "Yes or "No. There was no specific source for this information; therefore, the data team made two assumptions regarding the distributor field. First, if the data field was populated, it was assumed correct. Otherwise, the field was set to "No" unless the manufacturer name indicated that it was a distributor.

Company Name, Address, City, County, State, Country and Zip Code. These data fields relate to the location of the HAZMAT vendor/manufacturer. All data entry/validation for these fields was performed with no difficulties, except for the County field, which was rarely listed in Fedlog or HMIS. Because there were no available data, the County data field was left blank.

Phone and Fax Numbers. These data fields were also entered/validated with little difficulty. Fax numbers were sometimes left blank because they were not listed in HMIS or Fedlog.

5.0 CAS RECORD DATA ENTRY/VALIDATION PROCEDURES

As mentioned in Section 1.3, CAS records were not updated because AF-EMIS Version 6.1, which was recently released and installed at Andrews AFB, contains updated CAS records, including some new fields. Since the data was updated recently with the new version of AF-EMIS, PES did not update the CAS records.

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6.0 CAGE (MSDS) RECORD DATA ENTRY/VALIDATION PROCEDURES

The sources of information needed to enter/validate information for the CAGE record data fields that the Base AF-EMIS stakeholders wanted updated were as follows: Fedlog database and HMIS or MSDS. Table 6.1 lists these CAGE (MSDS) record data fields; the sources of information that PES used to update them; and the number of times data were entered for each data field. The AF-EMIS CAGE (MSDS) record screens are included as Figures 6.1 through 6.4.

A significant amount of time was spent "cleaning-up" the CAGE (MSDS) records because of two factors. First, some NSN records had multiple CAGE (MSDS) records associated with them. The only CAGE (MSDS) records that were needed for a NSN record were those for which their CAGE(s) were in the AF-EMIS inventory module (indicating that HAZMAT from the vendor corresponding to the CAGE was actually in the HAZMART) and those attached to the Form 3952. If the manufacturer-specific (specified by the CAGE) material were not in inventory or the material's MSDS were not attached to the Form 3952, the CAGE specific MSDS with the most recent MSDS preparation date was used (see NSN discussion). To allow for easy identification of the CAGE records selected by PES and the HAZMART staff to be kept active in the database, all other CAGE (MSDS) records were assigned appropriate Ounces and Types and the Status was set at "Inactive" (See Section 3 for more details on this issue).

PES could not locate a MSDS for 13 stock items (including local purchases). However, PES suspects that some of the stock numbers or CAGE numbers of these materials may be incorrect. For instance, some legitimate looking stock numbers (NSNs) could not be found in Fedlog. It is possible that a clerical error was made when entering the stock number onto the Form 3952 and AF-EMIS.

Table 6.1. CAGE (MSDS) Record Data Fields with Sources of Information and Number of PES Entries		
Data Field	**Source of Information**	**Number of PES Entries**
NSN	Form 3952 / HMIS	734
CAGE	AF-EMIS Inventory Module / HMIS	734
CAGE Status	Inventory / MSDS Date	3,394
CAGE Version	HMIS / MSDS	927
CAGE Component No.	HMIS / MSDS	918
Part No. or Trade Name	HMIS / MSDS	1,266
DOT Shipping Name	HMIS / MSDS	1,379
DOT Packaging Group	HMIS / MSDS	360
MSDS Date	HMIS / MSDS	1,046
Health Review Code	Form 3952	1,239
Health Hazard	HMIS / MSDS	1,600
Physical Hazard	HMIS / MSDS	1,603
Ounces	Fedlog / HMIS / Form 3952	2,621
Type	Fedlog / HMIS / Form 3952	2,656
Specific Gravity	HMIS / MSDS	1,156
Density	HMIS / MSDS	1,330
Flash Point Type	HMIS / MSDS	1,264
Flash Point Min. and Max.	HMIS / MSDS	805
Vapor Pressure with Units	HMIS / MSDS	958
pH Type	HMIS / MSDS	1,273
pH Min. and Max.	HMIS / MSDS	235
VOC with Units	HMIS / MSDS	660
Storage Pressure	Fedlog/HMIS/MSDS	1,589
Storage Temperature	LG/Supply	1,589
Container Type	Fedlog / HMIS / 3952	1,631
Chemical Form	HMIS / MSDS	1,421
Remarks	HMIS / MSDS	174
Constituents – CAS	HMIS / MSDS	4,552
Constituents – Chemical Name	HMIS / MSDS	4,552
Constituents – Amount Min. and Max.	HMIS / MSDS	4,422
Constituents – Concentration Units	HMIS / MSDS	4,632
Constituents – % Weight or Volume	HMIS / MSDS	4,457
Constituents – EPCRA Physical State	HMIS / MSDS	5,196
Constituents – TRI Qualifier		86

FIGURE 6.1
AF-EMIS CAGE (MSDS) RECORD SCREEN NUMBER 1 OF 4

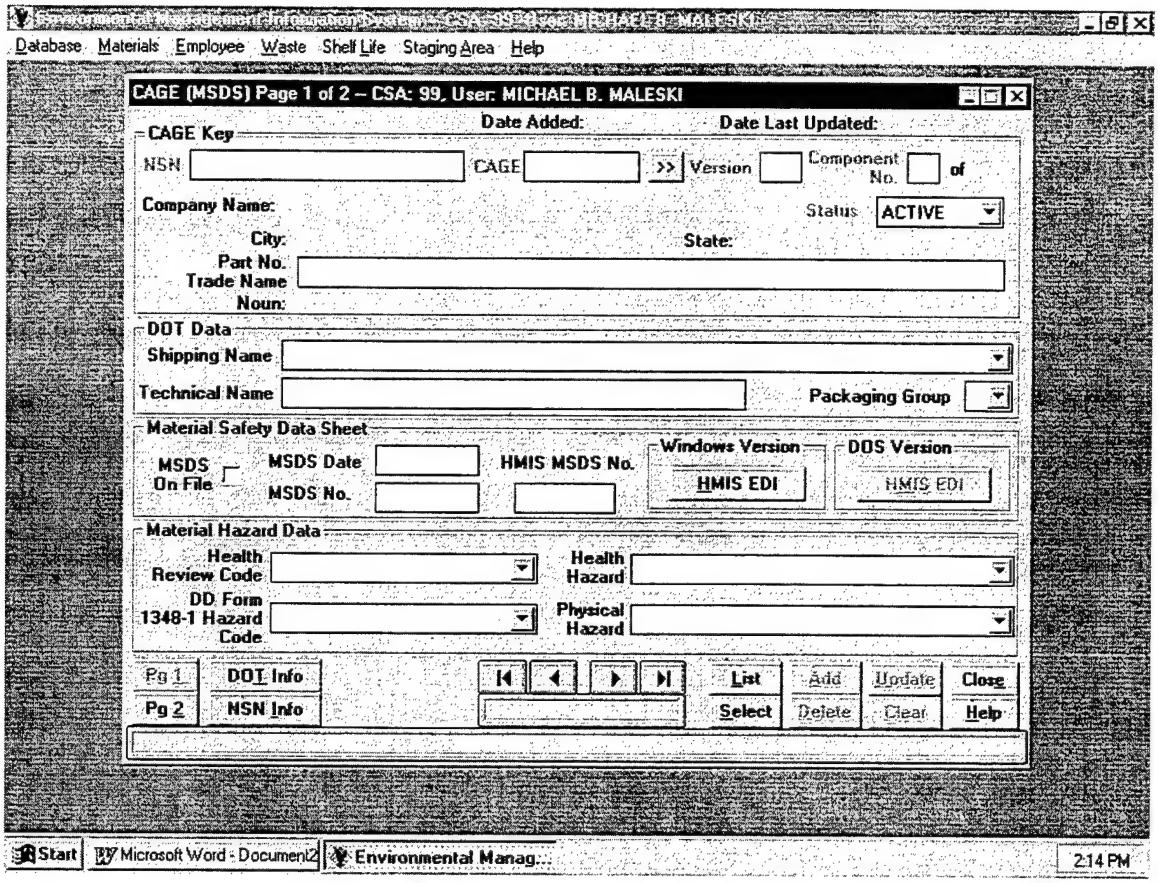


FIGURE 6.2
AF-EMIS CAGE (MSDS) RECORD SCREEN NUMBER 2 OF 4

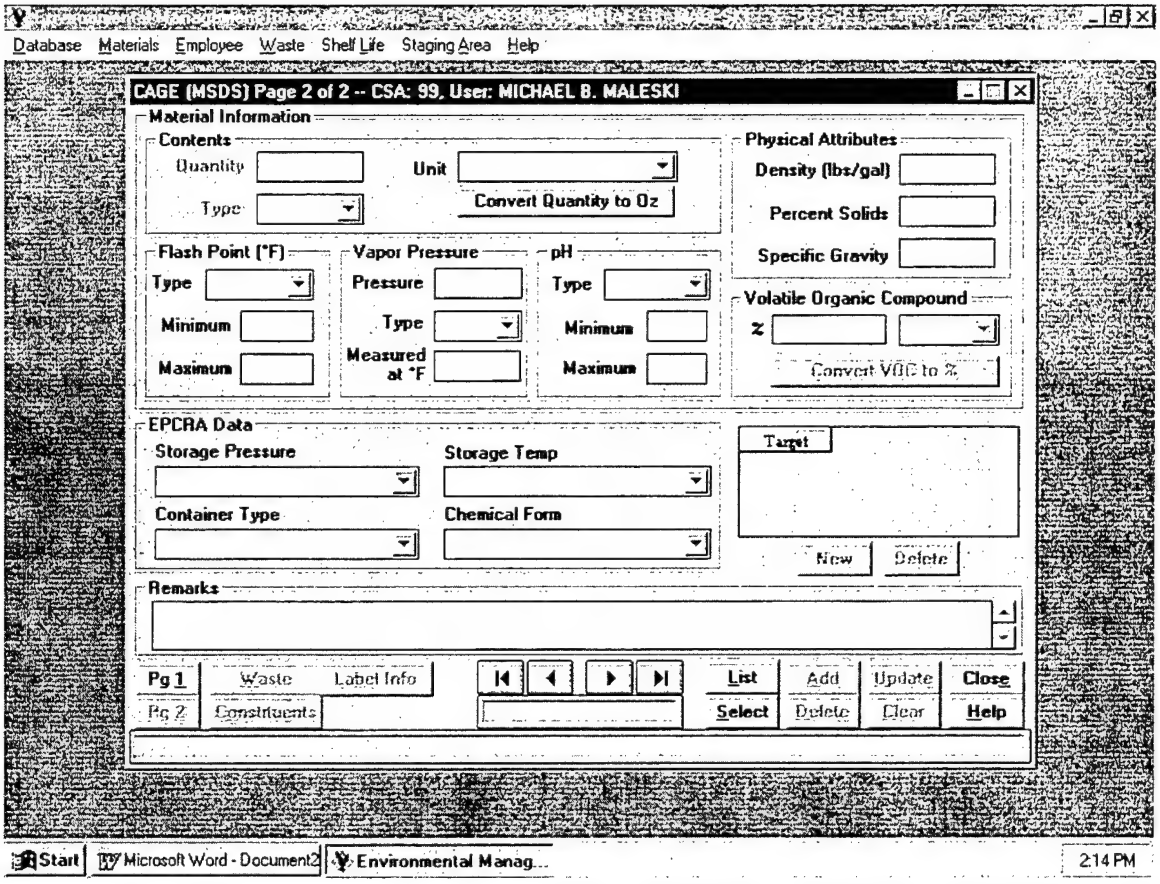


FIGURE 6.3
AF-EMIS CAGE (MSDS) RECORD SCREEN NUMBER 3 OF 4

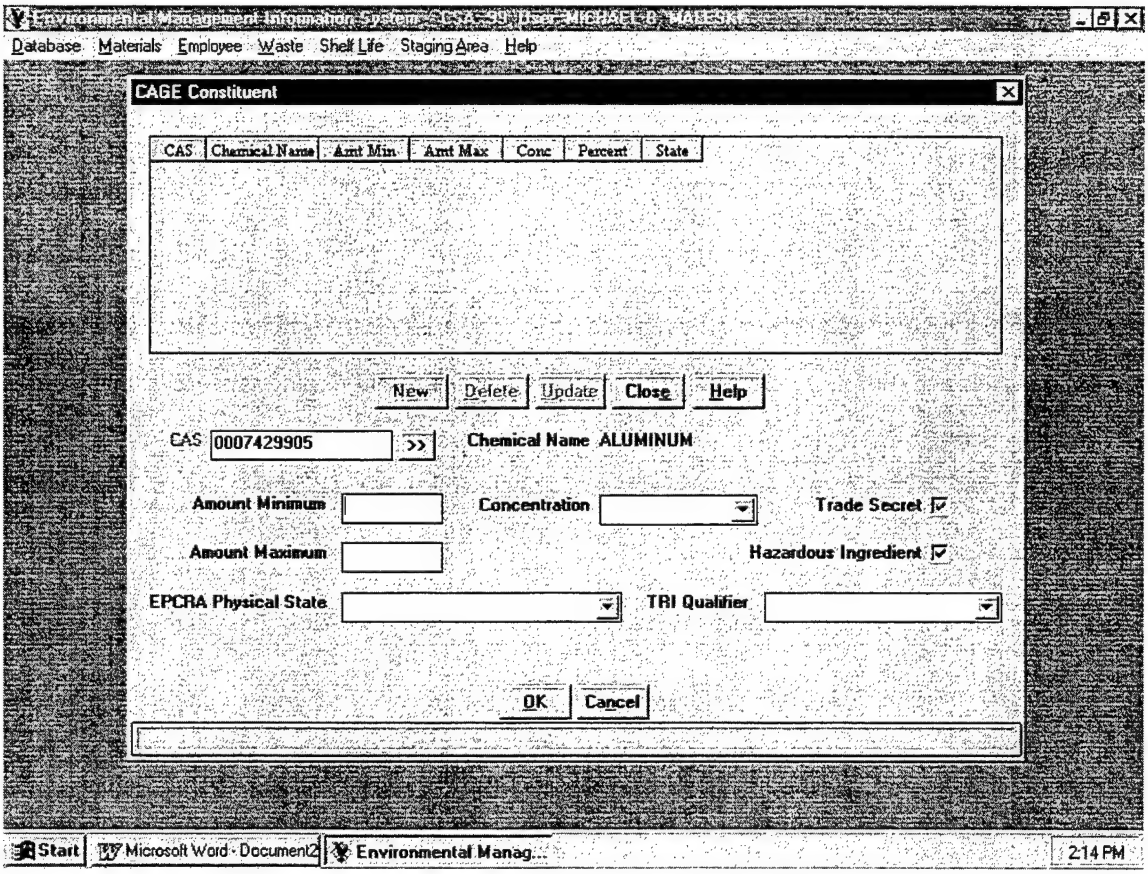
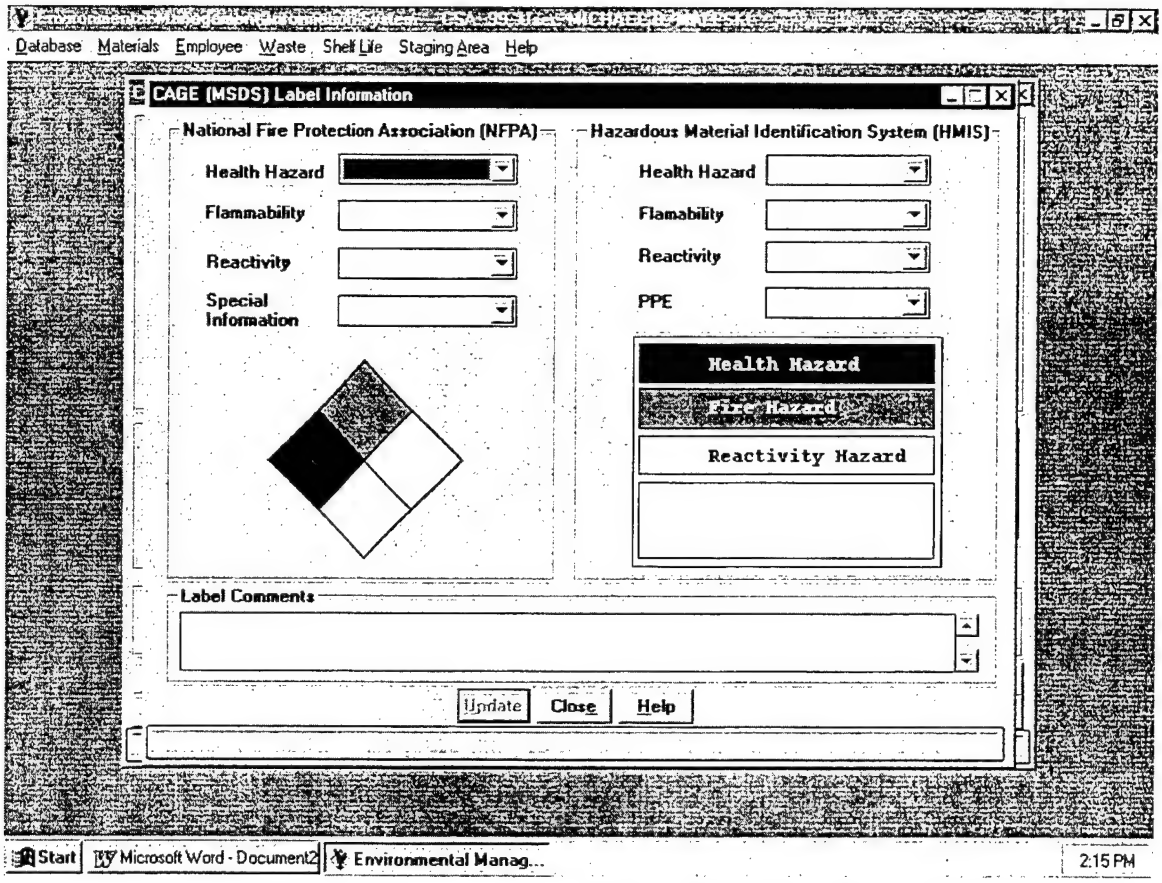


FIGURE 6.4
AF-EMIS CAGE (MSDS) RECORD SCREEN NUMBER 4 OF 4



This was definitely the case in a few instances as the correct stock numbers were found for some incorrect NSNs entered onto Form 3952s. The same could be possible for CAGE numbers as well. Base personnel should review the Form 3952s of these suspect stock numbers with the Shop point of contact to clarify the stock number and/or obtain a MSDS.

In addition, the 13 NSN records that were lacking either size data also prevented the population of CAGE records. Overall, PES populated/validated 1,662 of approximately 2,450 CAGE records. The remaining CAGE records were not completed for the same reason as their associated NSN records.

Once the correct CAGE(s) had been identified as part of NSN record population and all others made inactive, all the CAGE record data fields were entered or verified.

One method not utilized was the "Import MSDS from HMIS" feature in AF-EMIS. Use of this feature automatically populated the following CAGE (MSDS) record data fields:

- NSN;
- CAGE;
- Part Number or Trade Name;
- MSDS Date;
- MSDS Number;
- Ounces with Type;
- Container Type;
- Flash Point Type/Minimum/Maximum;
- DOT Technical Name and Packing Group;
- Vapor Pressure with Type;
- Specific Gravity;
- Constituent CAS;

- Constituent Name;
- Constituent Concentration with Units; and,
- Constituent Weight or Volume Percent.

Although this information is imported directly from HMIS, it should be checked to assure that the import procedure worked correctly. In some instances, corrections are required to imported information, such as Vapor Pressures with Type. For these data fields, AF-EMIS may import the Vapor Pressure and Temperature into the same vapor pressure data field. For example, a vapor pressure of "50@70 (mm Hg@°F)" sometimes is imported in the Vapor Pressure field as 5070 mm Hg. Also, some constituents are not always imported because the HMIS CAS data field is either blank or incorrect.

PES did not utilize the AF-EMIS Import MSDS feature because of the need to verify and correct some imported data fields. Instead, the HMIS information was manually entered into the database. This method worked well when two computers were used; one machine had AF-EMIS on-screen while the other had HMIS on-screen. Since some information had to be entered/validated manually even when the electronic import feature was used, it was more efficient to manually enter all information rather than to execute the electronic import, check imported information, then enter the remaining data.

NSN. The NSN was obtained from the Form 3952 and the list of materials issued in the past two years. The number of NSNs entered into AF-EMIS CAGE records by PES is the sum of NSNs associated with added NSN records and the NSNs associated with the CAGE (MSDS) records created to correct the CAGE version and component(s).

CAGE. The CAGE numbers to be entered were chosen as described in the NSN record discussion in Section 3.

CAGE Status. This data field establishes the status of the CAGE (MSDS) record as "active" or "inactive". Each NSN record must have at least one "active" CAGE (MSDS) record. As discussed above, a CAGE (MSDS) was chosen based on two criteria. The first criteria was that the AF-EMIS inventory module showed that some of the HAZMAT from the supplier identified by the CAGE was issued in the past; if the HAZMAT corresponding to this NSN/CAGE combination was issued in the past, this CAGE (MSDS) was "active". The second criteria was, if the CAGE specific MSDS was attached to the Form 3952, this CAGE (MSDS) was also "active".

As discussed above, a large number of CAGE records were updated to inactivate CAGE records for suppliers that are currently not being used on Base and those that were incorrectly assigned improper versions and CAGE component numbers. PES either updated/validated the status of 3,394 CAGE (MSDS).

CAGE Version. The CAGE Version data field represents the version of the MSDS. When the database contained multiple versions of a MSDS, there should be a CAGE (MSDS) for each version. Each record should have the same CAGE code but a different CAGE Version with the next letter value (i.e., old version "B", new version "C").

For multi-component HAZMAT, PES entered all parts of a multi-component HAZMAT with the same version in the AF-EMIS database.

CAGE Component Number. For multiple component HAZMATs, a separate CAGE record must be created in AF-EMIS for each component. The CAGE Component Number data field identifies the component for which the information is presented in the CAGE record. While most materials were single part or component products, this data field was designed to accommodate multi-part kits, such as a two-part epoxy. In HMIS, the CAGE Component Number was

typically found in the Part Number or Trade Name field. In addition, Fedlog and the Transportation Data section of HMIS occasionally would show component information.

Part Number or Trade Name. This data field contains the manufacturer's (or vendor's) part number or trade name for the material. It can be found in the HMIS data field "Part Number/Trade Name", located in the top section of the HMIS screen. Typically, the Part Number or Trade Name pre-loaded in the CAGE records by the AF-EMIS software developer required only minor revisions by PES.

DOT Shipping Name. This data field represents a combination of the Department of Transportation (DOT) Identification Number and Proper Shipping Name for the material. A pick-list provided many of the shipping names that PES needed, including a selection of "Not Regulated" if the material was not regulated by DOT. A small number of materials had DOT shipping names that were not on the pick-list. For these materials, the shipping name was manually typed into the DOT Technical Name data field, which is located below the shipping name. DOT Shipping Names were populated for all active CAGE records.

DOT Packaging Group. The packaging pick-list data field provides four options; blank (none), I, II, and III. PES updated such information for approximately 360 materials.

MSDS Date. The MSDS Date represents the date the MSDS was prepared or revised. Along with the data field HMIS MSDS Number, these data fields are the basis for the Import MSDS feature. It can be found in HMIS as "Date MSDS Prepared" in the General Information section or near the beginning or end of manufacturers' MSDSs.

Health Review Code. This data field is identical to the Health Review and IEX Code data fields in the associated NSN Record. To quickly access the associated NSN Record, there is a "NSN" button located in the bottom left corner of the first page of the CAGE (MSDS) Screen. "Clicking" the mouse pointer on this button will reveal a summary of all NSN Record data fields for that NSN. Upon closing this NSN summary, the same IEX Code was entered in this Health Review Code data field. Naturally, any data gaps that occur in the Health Review and IEX Code data fields in the NSN Record also occur in the associated CAGE Record.

Health Hazard. This data field represents the specific hazard to human health. It is on page one of the CAGE (MSDS) record screens; another non-required Health Hazard data field that the Base AF-EMIS stakeholders wanted PES to update is on page two of the CAGE (MSDS) screens, under Label Information.

A pick-list containing various health hazards, such as irritant or carcinogen, is provided. This information was found in the Health Hazard Data section of HMIS. The information in this section did not identify a specific health hazard; interpretation of the information was required. Typically, materials were described as an irritant. Some materials had other specific hazards listed, such as carcinogenicity.

Physical Hazard. The Physical Hazard data field represents the physical hazards associated with the material. A pull-down menu provides a set number of choices. In the general information section of HMIS, the hazard characteristic code, if available, is given by a code consisting of one letter followed by one number, such as F1. This code is the same code as the Hazard Characteristic Code in the NSN record of AF-EMIS; the associated pick-list shows each code along with a description of that code. This description corresponds to the options in the Physical Hazard data field.

There were three situations for which the exact code and description given in HMIS was not used to populate this data field in AF-EMIS. The first situation was when HMIS showed a hazard characteristic code of "N1", the corresponding description in the AF-EMIS Hazard Characteristic Code was "Nonhazardous Material". Because this option does not exist under Physical Hazard, "No Specific Hazard" was used instead.

Another situation was when HMIS did not list a hazard characteristic code. When this occurred, the transportation data section of HMIS, which occasionally describes the physical hazards associated with the material, was checked. For this situation, the option under Physical Hazard that best fit the description given in HMIS was selected.

The last situation was when HMIS did not list a hazard characteristic code or informative transportation data for the HAZMAT. When this occurred, "No Specific Data" was chosen from the pull-down menu under Physical Hazard. The Physical Hazard data field was populated or updated for virtually all CAGE records.

For a manufacturer MSDS, the physical hazard was obtained by searching the entire MSDS for data that would indicate the physical hazard of the material. Typically, the transportation data section or hazard identification section would indicate any physical hazards.

Ounces. This AF-EMIS-mandatory data field specifies the number of ounces per unit of issue as indicated in the NSN record for that material. The ounces are either in terms of weight or volume; the next data field, "Type", provides this selection. The information used by PES to populate this field was obtained by converting the units of measurement of the Size and Unit data fields in the NSN record to weight- or volume-based ounces.

With respect to units of measurement, the ounces data field represented typical conventions. For instance, a quart of oil would be entered as 32 fluid ounces or a pound of grease as 16 net ounces. As long as the specific gravity and density are entered correctly (especially for compressed gases), it does not matter whether the ounces are measured by weight or volume.

The Ounces and Type data fields are used to generate storage and usage reports used for regulatory reporting, such as the Chemical On-Site Summary and Issues Containing EPA 17 chemicals. Thus, it is crucial that these fields be entered correctly. PES found that many of the Ounces and Type fields were incorrect or blank. One typical error found by PES was that pounds were entered in the Ounces field.

Type. This data field indicates the measurement unit for the value entered in the Ounces data field. A pick-list provides two choices; fluid for volumetric units or net for mass units. As discussed above, this data field must be entered correctly as numerous reports are generated using this data.

Flash Point Minimum, Maximum, and Type. These three data fields all relate to a temperature or range of temperatures at which a material releases vapor sufficient to form an ignitable vapor mixture near the surface of the material. Each of these data fields were typically found in either a MSDS or HMIS.

The Flash Point Type data field provides a pick-list with two options; range or not applicable (N/A). When flash point data was available, the "Range" option was selected; otherwise, "N/A" was selected. The Flash Point Minimum and Maximum data fields were populated from available flash point data from a MSDS or HMIS. If a single flash point was listed in either of the aforementioned reference, this value was entered into the Flash Point Minimum and Maximum data fields.

The Flash Point Minimum and Maximum data fields cannot be populated with zero when no information is available. This actually means that the material is extremely flammable. Care must be taken to populate these data fields correctly when no information is available; the Flash Point Type data field should be "N/A" and the Flash Point Minimum and Maximum data fields should be blank.

pH Type, Minimum, and Maximum. The pH Type data field is populated from a pick-list to indicate whether pH is not applicable to the HAZMAT material ("N/A") or if the value is entered as a range ("Range"). If the Type is not applicable, the Minimum and Maximum data fields were left blank. If a pH was available, the pH type was "Range" and the minimum and maximum values were entered. If a single pH value was given in HMIS or a MSDS, the value was entered in both the Minimum and Maximum data fields. The pH value was given in HMIS for only 128 of the HAZMATs handled at the Base; PES entered these values in the AF-EMIS database.

VOC with Units. The VOC data field represents the amount of volatile organic compounds in the HAZMAT. The Units data field is a pick-list with the following choices: weight percent (%), pounds per gallon (lbs/gal), grams per liter (g/l), and not applicable (N/A). If no VOCs were present in the HAZMAT, the VOC data field was left blank and "N/A" was chosen from the Units pick-list. If VOCs were present in the HAZMAT, the value was entered and the appropriate units were selected. If the units were pounds per gallon or grams per liter, it was necessary to use the AF-EMIS unit conversion feature. There is a button labeled "Convert" near the Units data field; clicking the mouse pointer on this button converts these units to a weight percentage.

VOC information was found either on a MSDS or in HMIS, typically under the Physical Characteristics section. Occasionally, the VOC concentration was included in the ingredients information or transportation data section.

Care must be taken to note whether the VOC concentration is reported in terms of weight or volume. MSDSs and the HMIS ingredients information typically noted weight or volume units. In the HMIS Physical Characteristics section, the VOC concentration was reported in terms of volume. When VOC units were presented in terms of volume only, data was entered with respect to volume as this provided a reasonable estimate of the VOC weight concentration. Verification of volume-based VOC concentrations were based on a review of the actual ingredients; adjustments were made for some VOC concentrations after this review.

Specific Gravity and Density. The specific gravity and density of the HAZMAT were available from a MSDS or HMIS for nearly all of the authorized materials. When the MSDS or HMIS did not have a specific gravity or density, the HAZMAT was typically a solid; the specific gravity and density were given for some solid materials. The specific gravity was located in the Physical Characteristics section of HMIS. The density, reported in pounds per gallon, was calculated by multiplying the specific gravity by the density of water, 8.34 pounds per gallon.

Vapor Pressure, Type, and Measure Temperature. These data fields represent the vapor pressure, with units (pounds per square inch or mm Hg) and reference temperature of the HAZMAT. Approximately one half of the materials had a vapor pressure sufficiently high enough to report (above 0.01 mm Hg). The remaining materials were solids or liquids with low vapor pressures, such as oil.

As previously mentioned, corrections were required for electronically imported vapor pressures. For these data fields, AF-EMIS would import the vapor pressure and temperature into the same vapor pressure data field. For example, a vapor pressure of "50@70 (mm Hg@°F)" sometimes was imported in the vapor pressure field as 5070 mm Hg.

Storage Pressure. This new data field for AF-EMIS (included in Version 6.0, not earlier versions) represents the pressure at which the material is stored. There are three options provided by this pick-list data field: ambient pressure, greater than ambient pressure, and less than ambient pressure. For instance, compressed gas cylinders, spray paints and aerosol cleaners are all stored at greater than ambient pressure. Most other types of materials are stored at ambient pressure. Materials that are stored at less than ambient pressure (under vacuum) rarely occur.

There is no single source of information that provides the data needed to populate this data field. Fedlog may list if the material is an aerosol or if it's a compressed gas (both greater than ambient pressure storage conditions). In addition, the MSDS for the material will typically list if the material contents are stored at pressures other than ambient. Since this data field was not included in previous versions of AF-EMIS, it was entered for all CAGE Records.

Storage Temperature. This data field represents the temperature at which a material is stored and is similar in design to the Storage Pressure Data Field. Three options are provided: ambient temperature, greater than ambient temperature, and less than ambient temperature. The best source of information for this data field is Supply personnel. Since they are responsible for procuring and storing the hazardous material, they should be aware of any requirements to store the material at depressed or elevated temperatures.

Container Type. This data field is identical to the Type Data Field in the NSN Record. The "NSN" button on page one of the CAGE Record Screen can be used to assure the two data fields match.

Chemical Form. This data field represents the chemical form as defined by EPCRA Form R reporting. There are two options provided in the pick-list; pure or mixture. The majority of hazardous materials used on Base are mixtures.

Mixtures are identified as materials that contain more than one constituent. Alternatively, materials that consist entirely of one constituent (i.e., 100 percent concentration) are pure materials. Care must be taken check for the number of constituents reported on a MSDS and the percent concentration of the constituents. There are many circumstances when a MSDS reports only one hazardous constituent; however, it is at a concentration of less than 100 percent (therefore reported as a mixture). The reason for this is that the remaining concentration is non-hazardous and is not required to be reported on the MSDS.

Constituent CAS and Name. The constituent data fields were populated by using the "Constituents" button located on the bottom left portion of the second screen. The Constituent CAS data field is a pick-list of the CAS numbers from the CAS records. Upon entering the CAS number from HMIS or a MSDS in the data field, the corresponding chemical typically appeared. Sometimes no chemical name would appear or the chemical name that appeared was incorrect. This situation resulted because either the CAS was not in the AF-EMIS CAS records or the HMIS CAS number was incorrect. If the AF-EMIS Import MSDS feature was used, such constituents would not be imported. In such cases, a search for the chemical name using the CAS pick-list search was utilized which allowed PES to locate the needed constituents. Material constituents listed in HMIS with generic names, such as additives, were not entered into AF-EMIS.

PES entered/validated approximately 5,000 constituents into the Andrews AFB AF-EMIS database. Some of this effort was required to replace constituent data lost when a new CAGE record was created to correct for the improperly entered CAGE Versions.

Constituent Concentration Minimum, Maximum, Concentration Units, and Percent By Weight or Volume. These data fields all relate to the amount of constituent in an authorized HAZMAT. The Minimum and Maximum data fields represent the numeric minimum and maximum concentrations of the constituent

in the authorized HAZMAT. If a single value was shown in HMIS, this value was entered for both fields. The Concentration Units data field provided three options for the minimum and maximum concentrations: parts per million (ppm), parts per billion (ppb), or percent (%). In all cases, PES entered the concentration in percent. When percent is selected from the units data field, another data field appears; percent by weight or volume. Most HMIS records and MSDSs reported concentrations in percent by weight; however, a few constituent concentrations were reported in units other than weight percentages. These concentration units were clearly identified as ppm, ppb, or volume percent. If the concentration units were specified as units other than weight percent, those units were used. If the concentration units were not specified, weight percent units were selected because this is the typical unit reported on a MSDS.

EPCRA Physical State. This data field represents the constituent state as defined by EPCRA Form R reporting. The following states are available in the pick-list: solid, liquid, gas, fine powder or dust, fibrous, molten, dissolved in solution, and fume. The majority of constituents were either a solid, liquid or gas. The remaining options apply to only a few chemicals (i.e., fibrous aluminum oxide).

TRI Qualifier. The TRI Qualifier data field is used to identify the physical or chemical state of certain constituents. It does not appear for all constituents because it is not applicable to all constituents. An example constituent where this data field appears is aluminum, where the TRI Qualifier pick-list options of fume or dust appear. For this example, if the material aluminum that is contained in this material is either a fume or dust, select the respective TRI Qualifier data option; If neither options apply, leave it blank.

This data field is based on the EPCRA regulations for reporting the storage and use of hazardous materials. In some instances, aluminum being one of them,

only certain forms of the chemical are hazardous or reportable with respect to EPCRA reporting.

This data field does not appear often since there are few materials which are hazardous and/or EPCRA reportable in limited physical or chemical states. PES entered less than 10 TRI Qualifier data fields for the approximately 3,500 constituents entered.

It should be noted that AF-EMIS does not account for the generation of EPCRA-regulated materials from reaction of air emissions. Care must be taken to account for such scenarios as they are required for EPCRA reporting.

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7.0 AUTHORIZATION RECORD DATA ENTRY/VALIDATION PROCEDURES

The sources of information needed to enter/validate the Authorization record data fields that the Base AF-EMIS stake holders wanted updated were as follows: Form 3952, Add Authorization Request Worksheets, and HMIS or MSDS. The AF-EMIS Authorization Record screens consist of one Authorization selection screen, twelve request screens, two certification screens and five review screens. These screens are included as Figures 7.1 through 7.20. Table 7.1 lists the authorization data fields to be populated; the source of information PES used to update each; and the number of times data were entered for each data field.

The most significant revision to the Hazardous Material Module from AF-EMIS Version 5.1 to Version 6.0 involved the authorization process. The major benefit is that the entire authorization process, from initial request to final approval, can be performed electronically without using paper. The new system is also flexible enough that the existing "paper system" of Form 3952 submittal and approval can be retained. Each Base can determine which authorization method best "fits" Base operations and set up AF-EMIS accordingly based on three options.

The first "paperless" authorization process is called "Authorized Work Flow". The option is initiated by a Shop representative entering data into a series of "Add Authorization Request" screens in AF-EMIS. This data is identical to the data that would normally be manually written on a hard copy Form 3952 (which a newly revised version now exists). Many of the data fields on these screens are required to be populated, otherwise the AF-EMIS system will not allow the record to be saved and progress to the next step.

FIGURE 7.1
AF-EMIS AUTHORIZATION SELECTION RECORD SCREEN

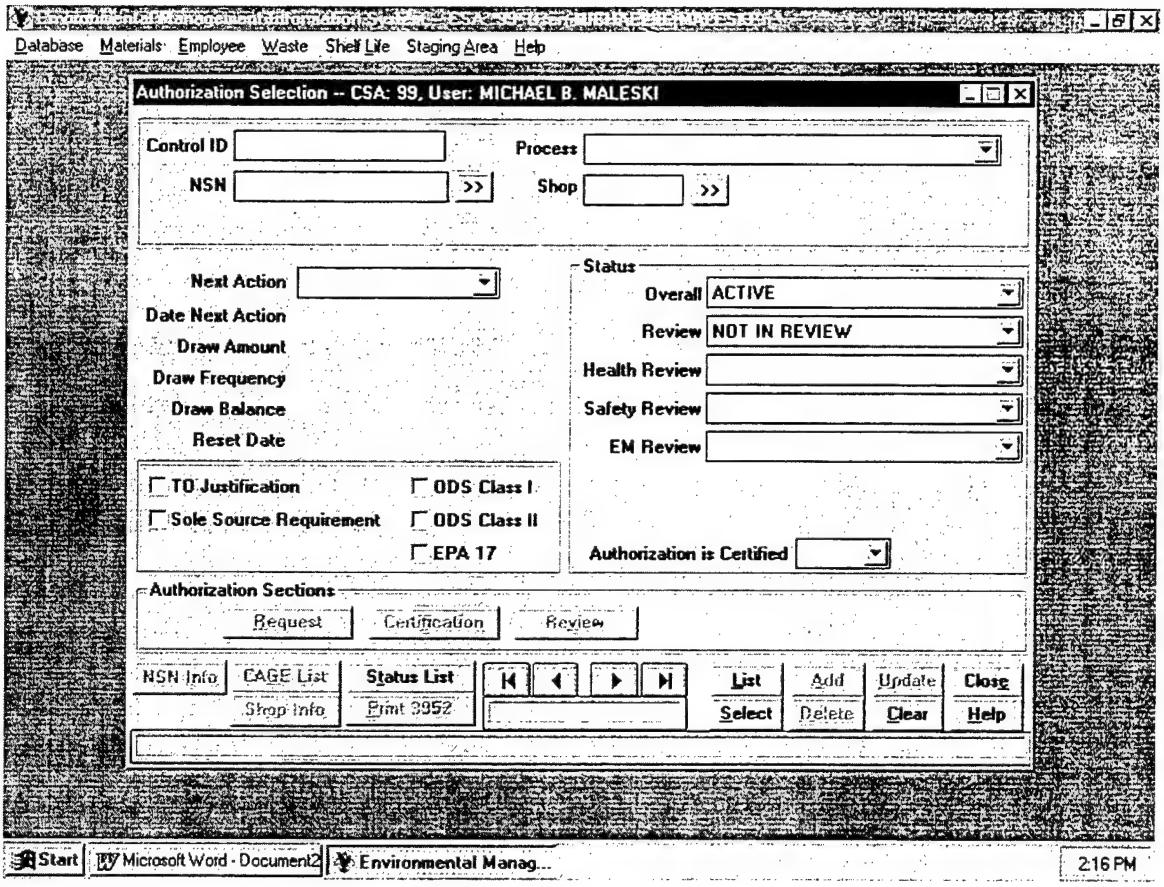

FIGURE 7.2
AF-EMIS AUTHORIZATION REQUEST RECORD SCREEN NUMBER 1 OF 12

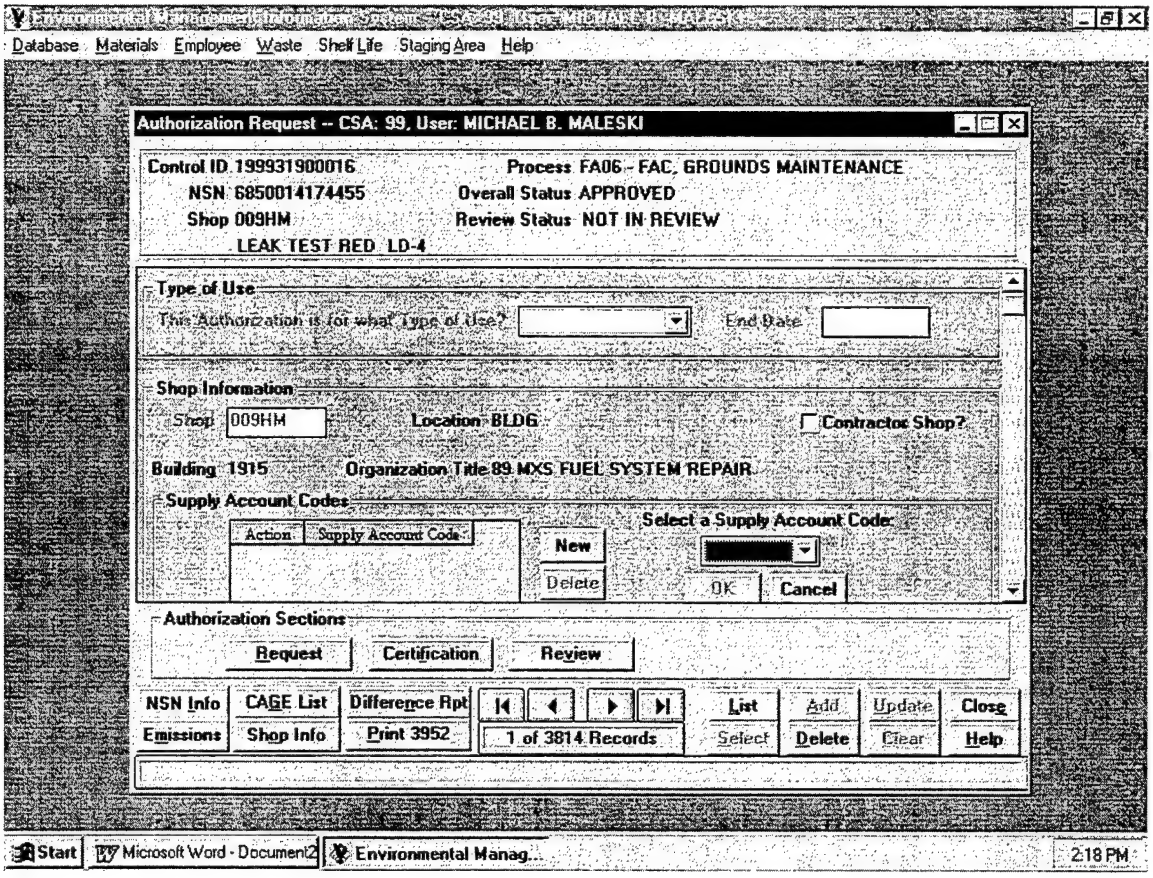

FIGURE 7.3
AF-EMIS AUTHORIZATION REQUEST RECORD SCREEN NUMBER 2 OF 12

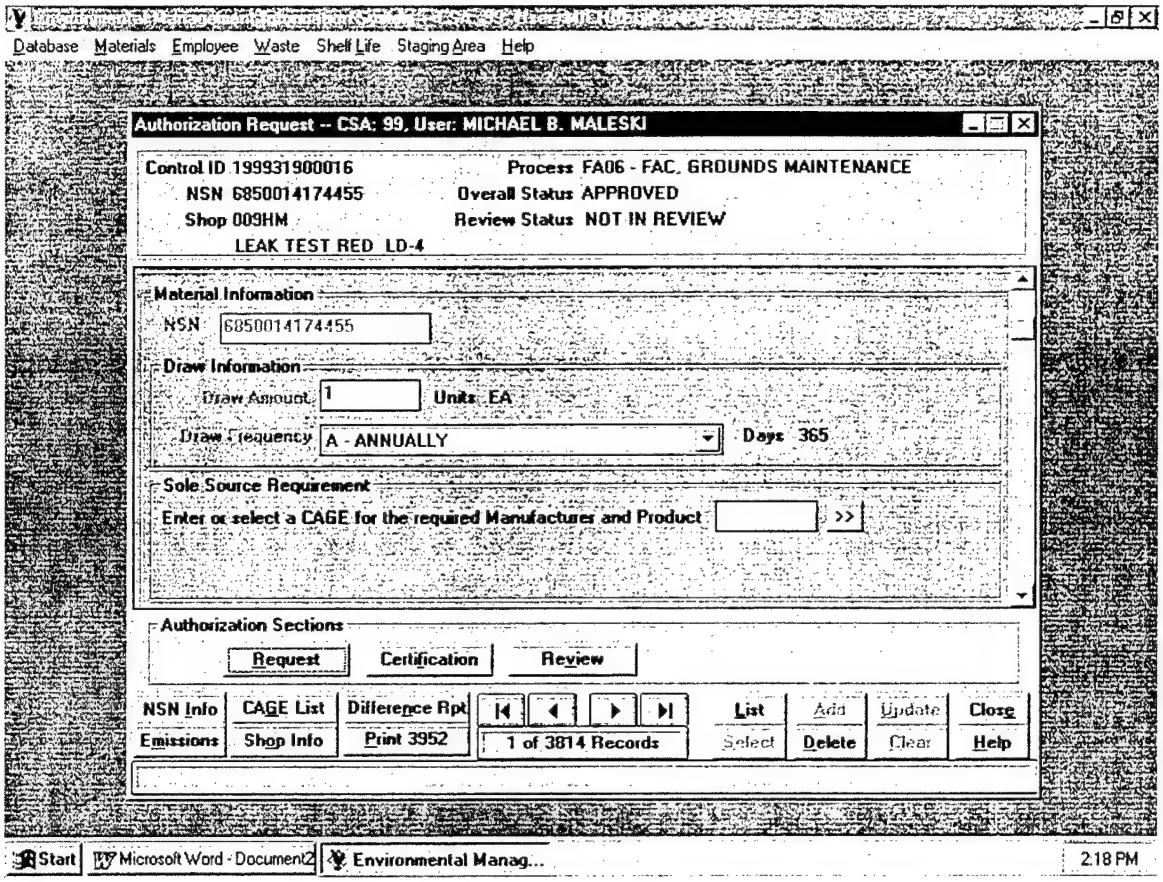

FIGURE 7.4
AF-EMIS AUTHORIZATION REQUEST RECORD SCREEN NUMBER 3 OF 12

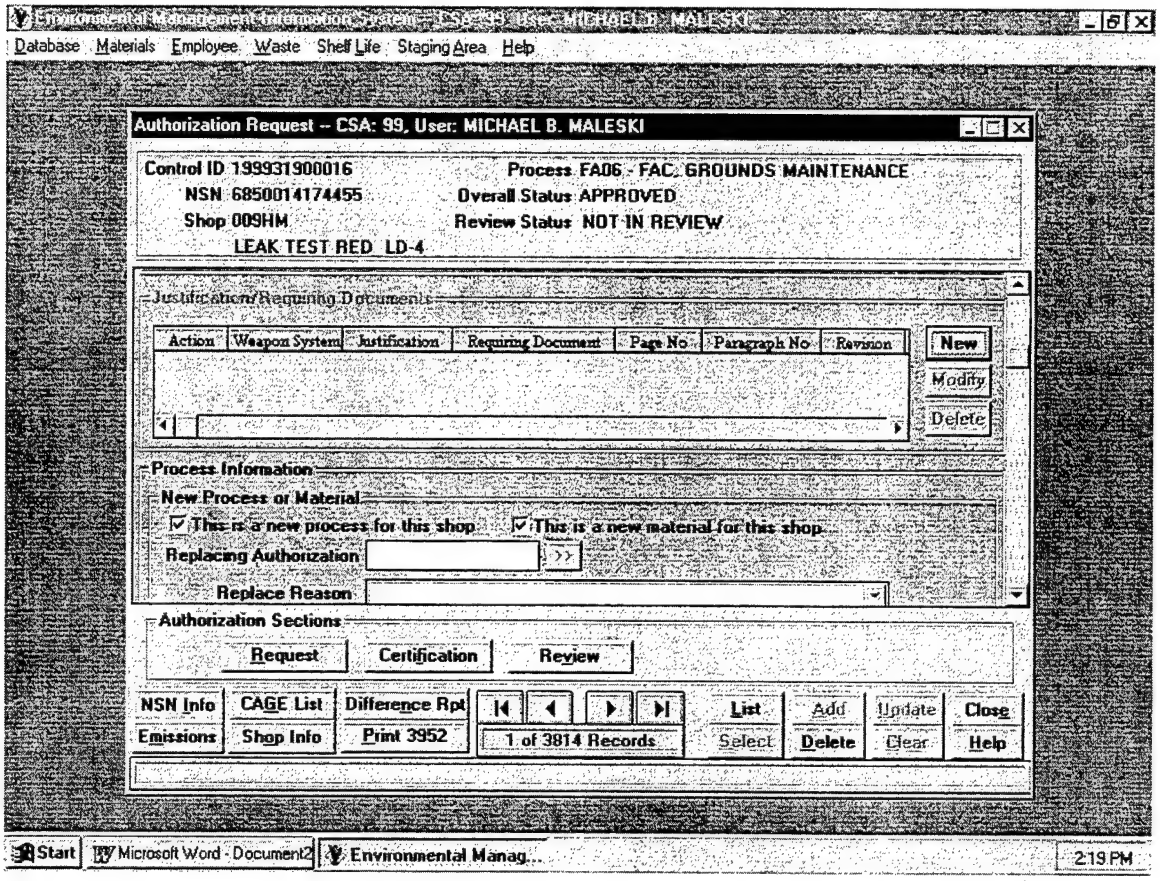

FIGURE 7.5
AF-EMIS AUTHORIZATION REQUEST RECORD SCREEN NUMBER 4 OF 12

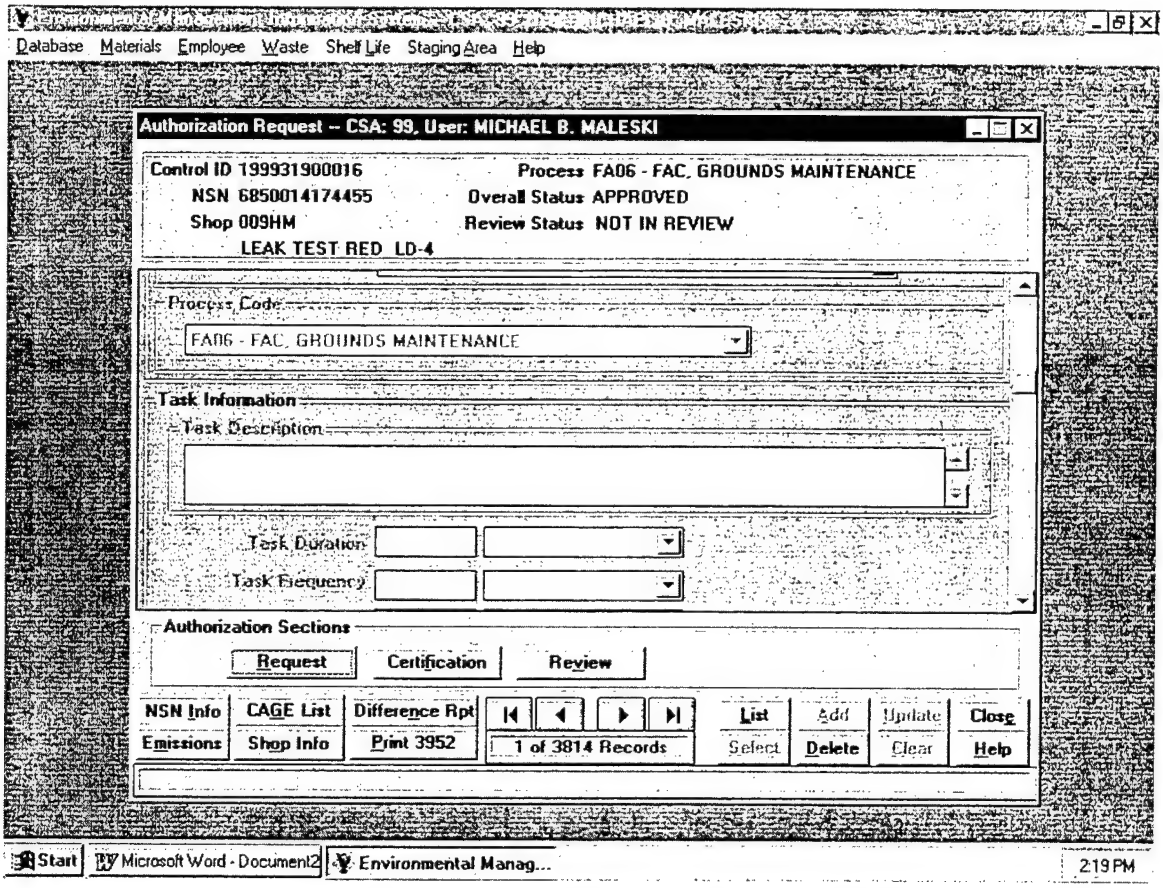

FIGURE 7.6
AF-EMIS AUTHORIZATION REQUEST RECORD SCREEN NUMBER 5 OF 12

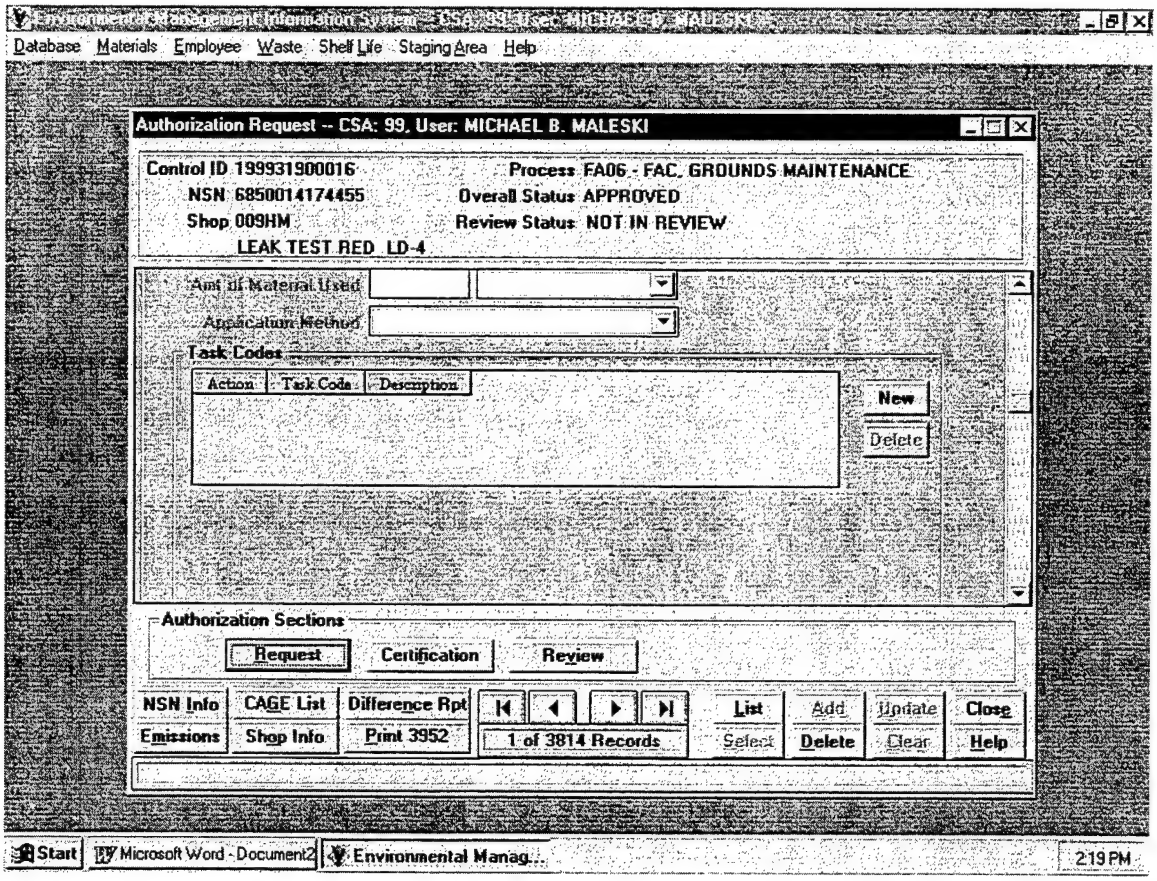

FIGURE 7.7
AF-EMIS AUTHORIZATION REQUEST RECORD SCREEN NUMBER 6 OF 12

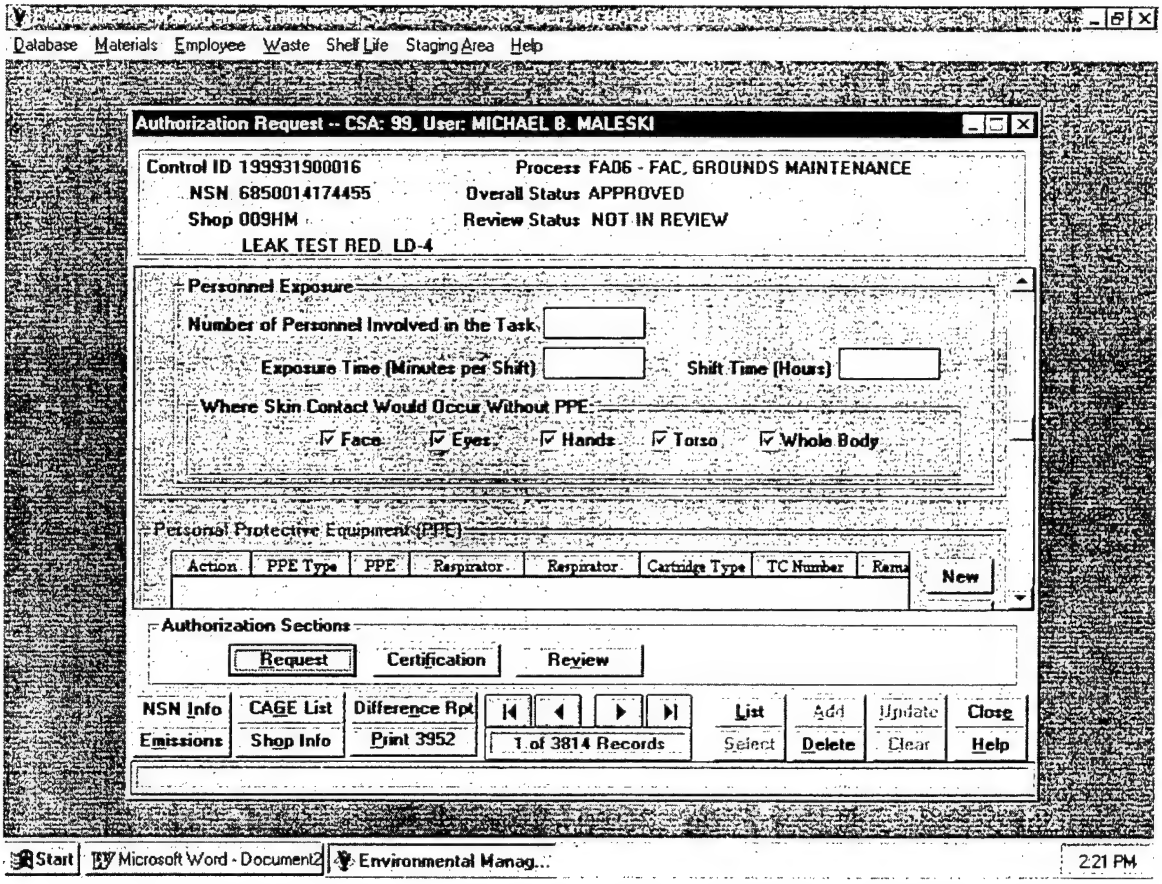

FIGURE 7.8
AF-EMIS AUTHORIZATION REQUEST RECORD SCREEN NUMBER 7 OF 12

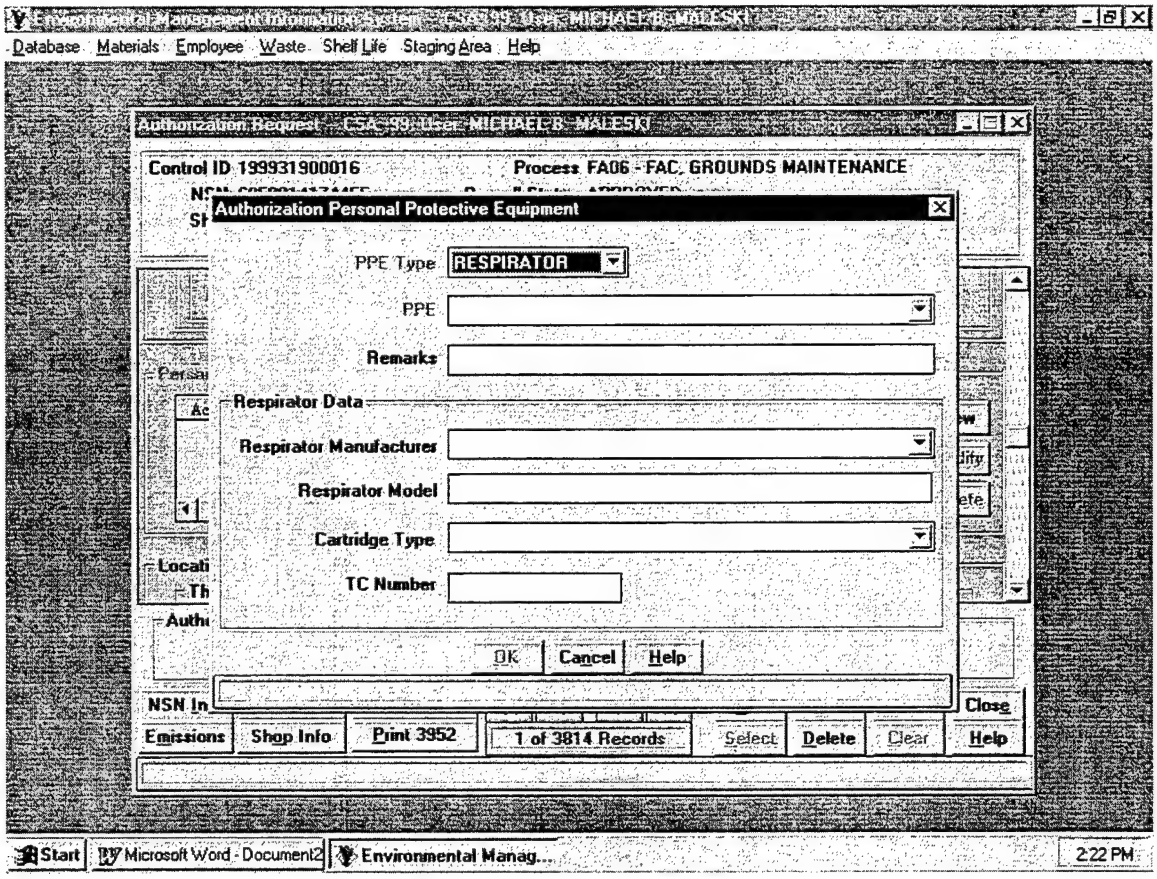

FIGURE 7.9
AF-EMIS AUTHORIZATION REQUEST RECORD SCREEN NUMBER 8 OF 12

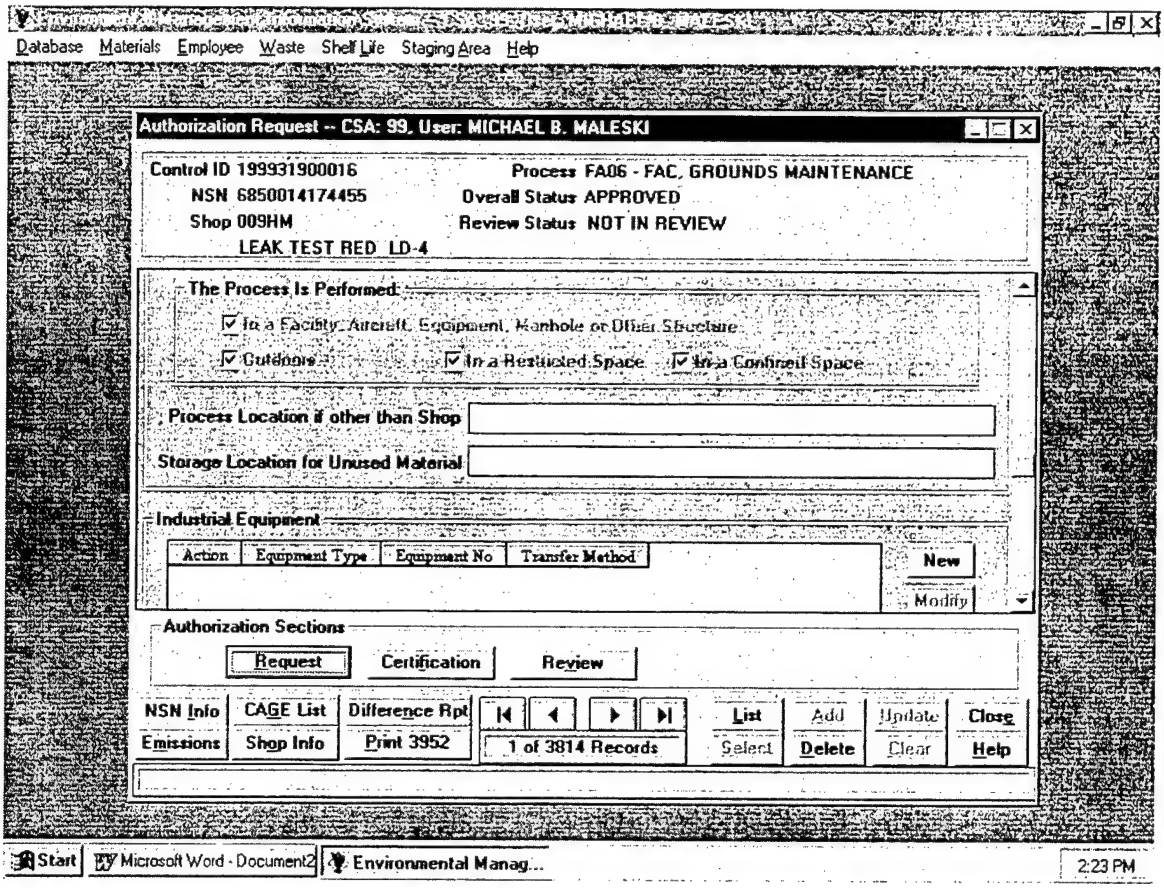

FIGURE 7.10
AF-EMIS AUTHORIZATION REQUEST RECORD SCREEN NUMBER 9 OF 12

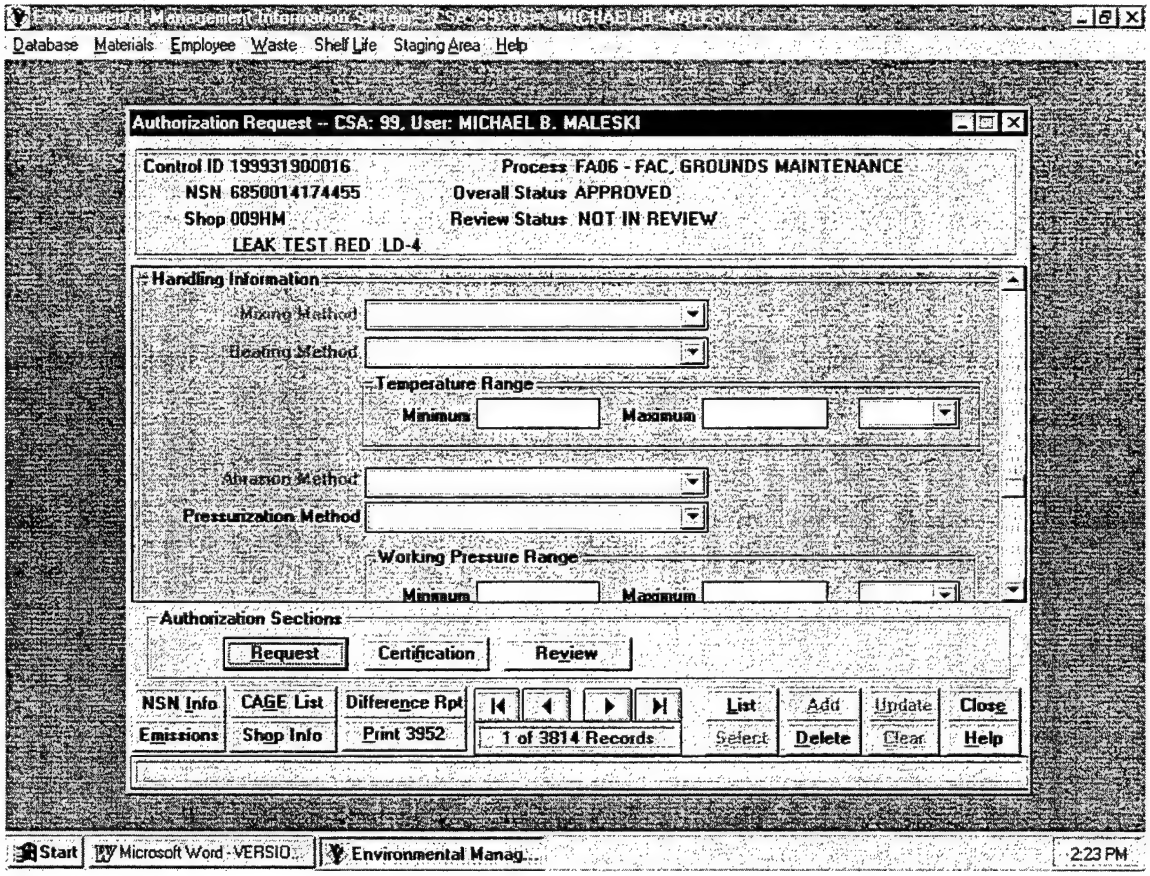

FIGURE 7.11
AF-EMIS AUTHORIZATION REQUEST RECORD SCREEN NUMBER 10 OF 12

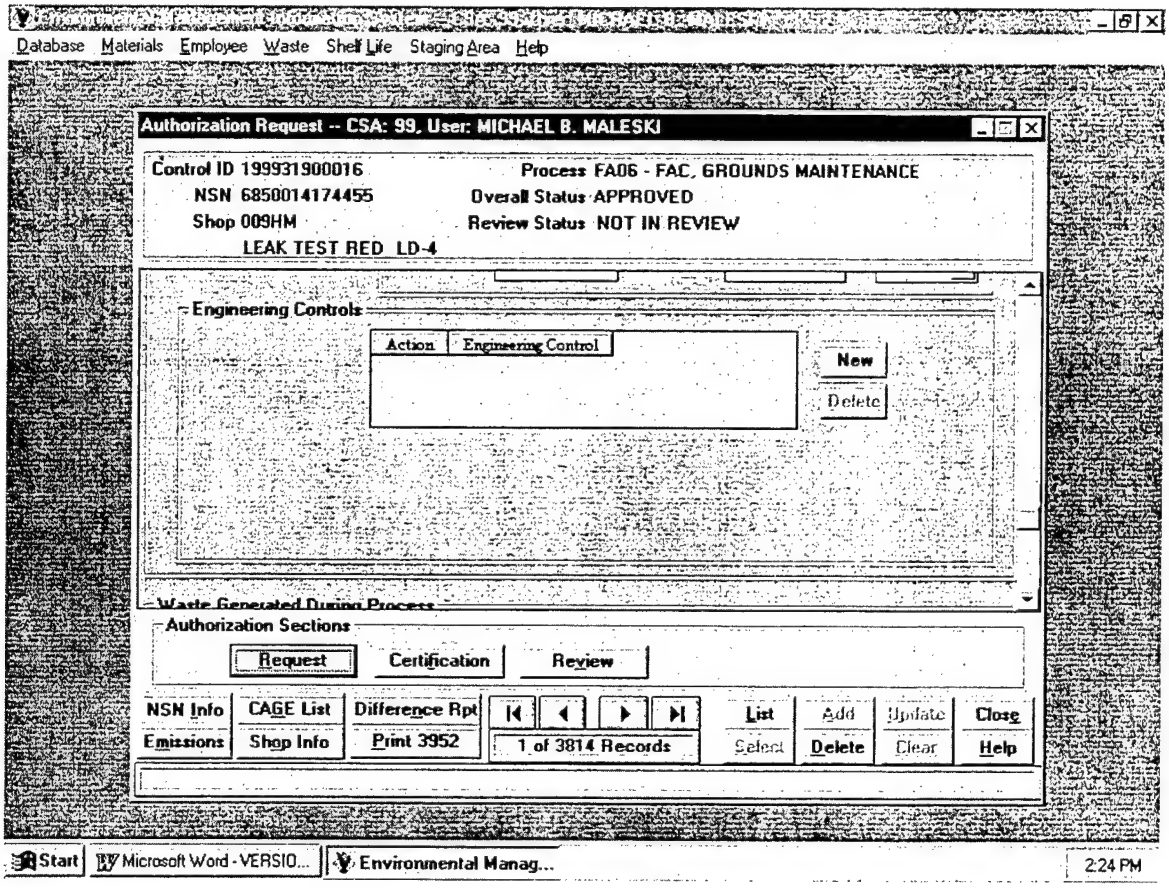

FIGURE 7.12
AF-EMIS AUTHORIZATION REQUEST RECORD SCREEN NUMBER 11 OF 12

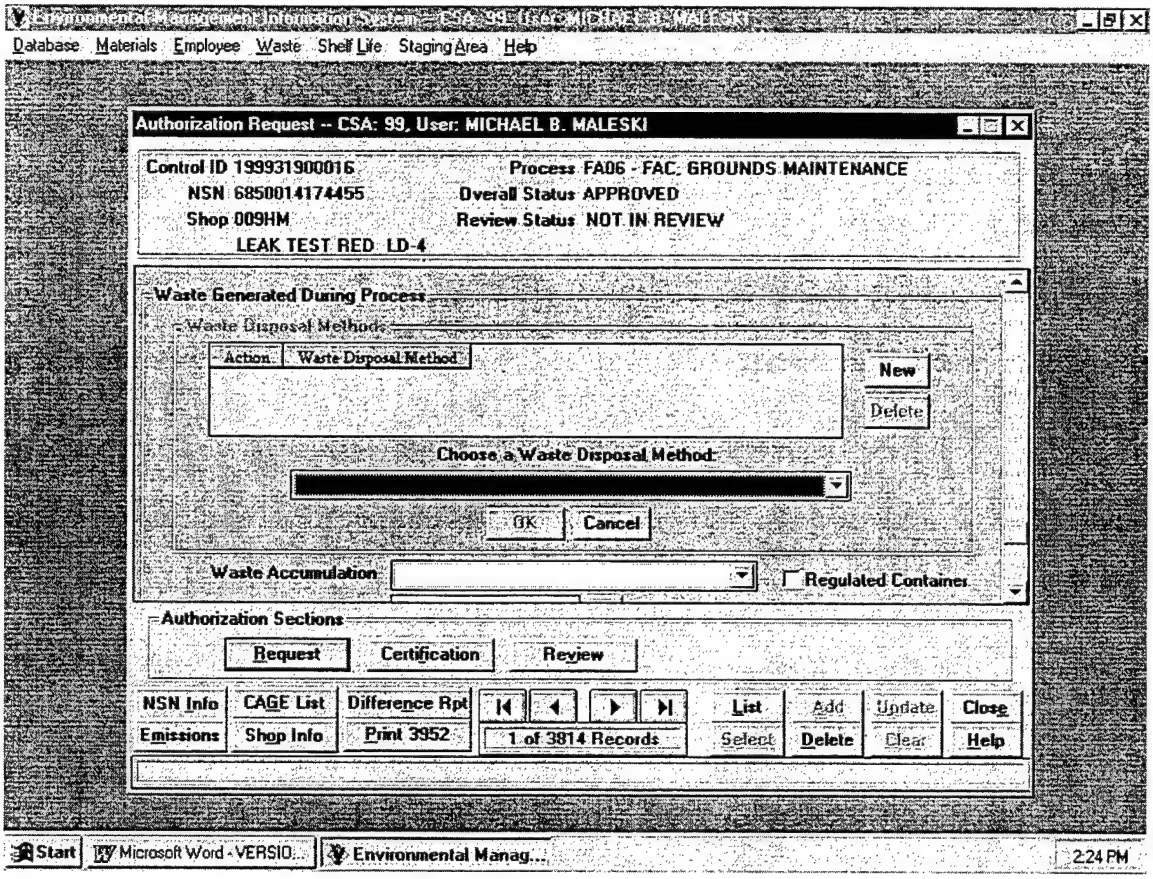

FIGURE 7.13
AF-EMIS AUTHORIZATION REQUEST RECORD SCREEN NUMBER 12 OF 12

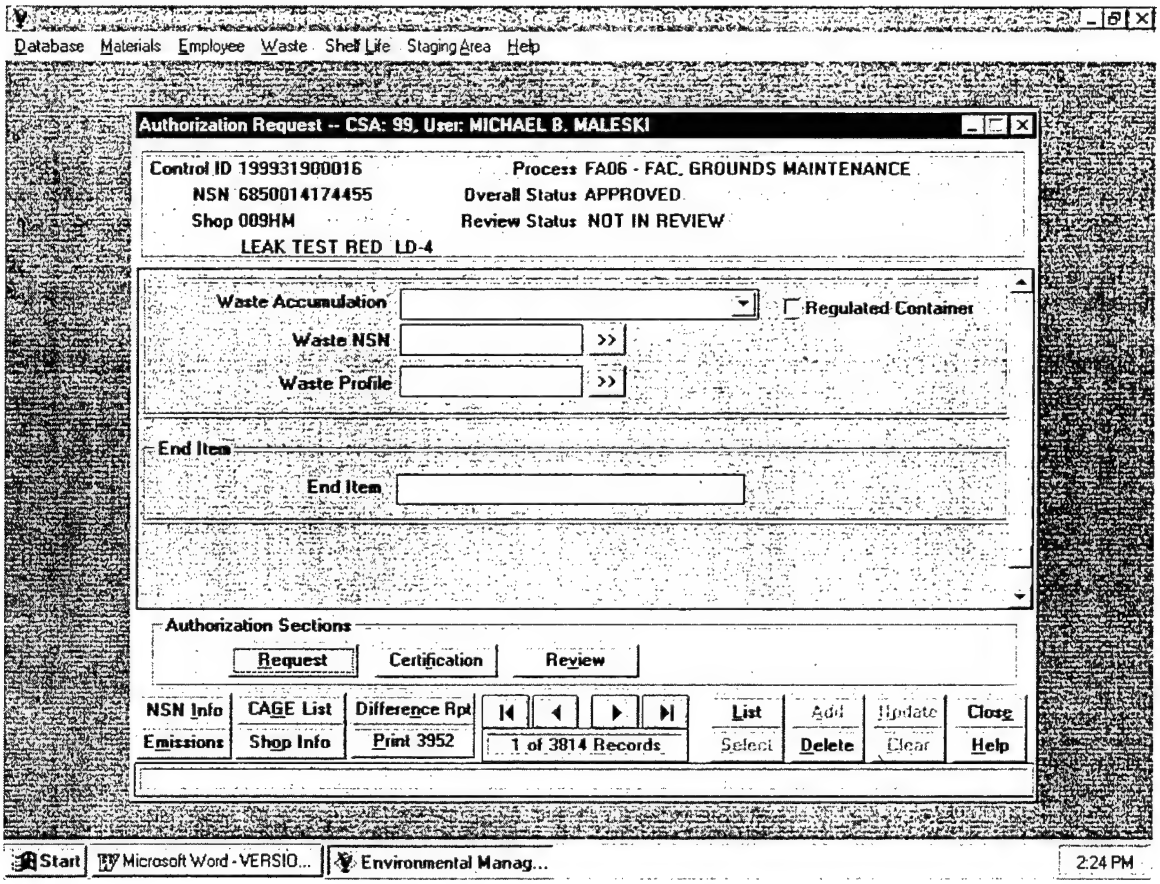

FIGURE 7.14
AF-EMIS AUTHORIZATION CERTIFICATION RECORD SCREEN NUMBER 1 OF 2

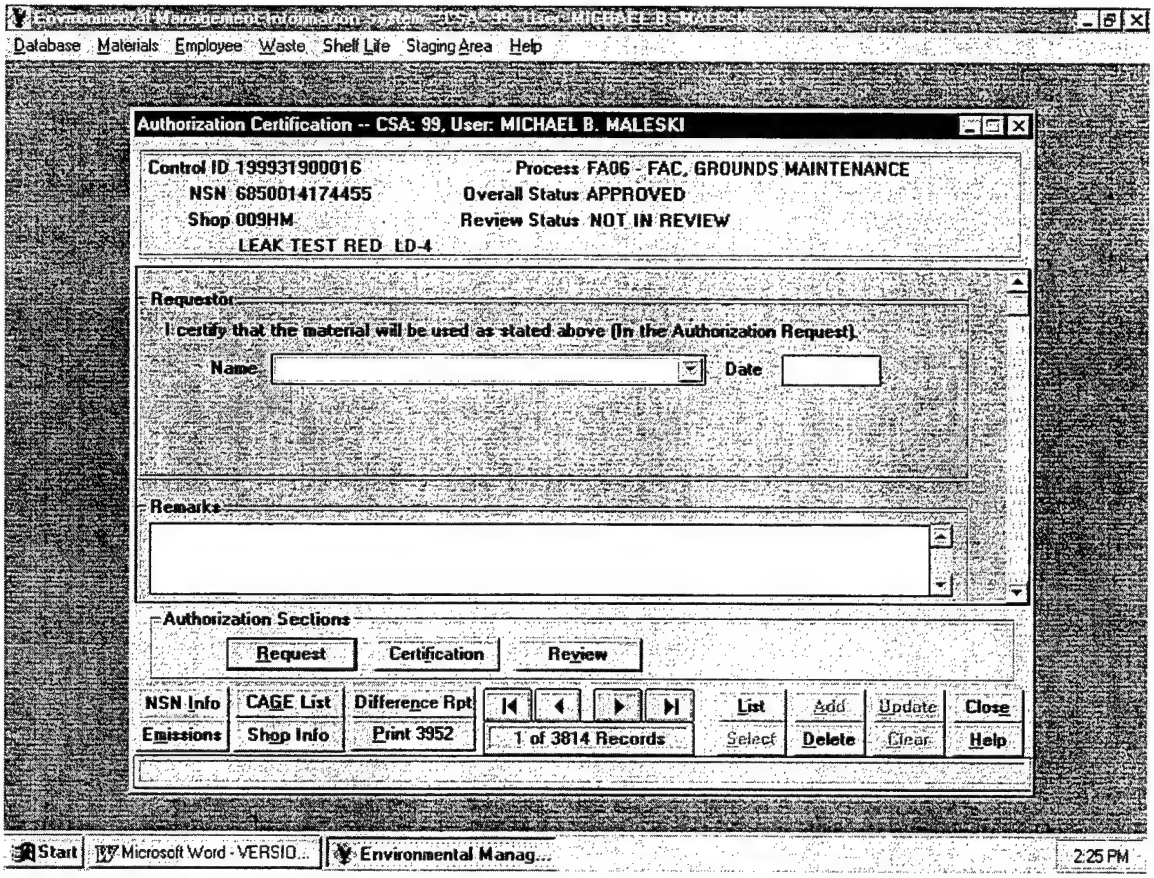

FIGURE 7.15
AF-EMIS AUTHORIZATION CERTIFICATION RECORD SCREEN NUMBER 2 OF 2

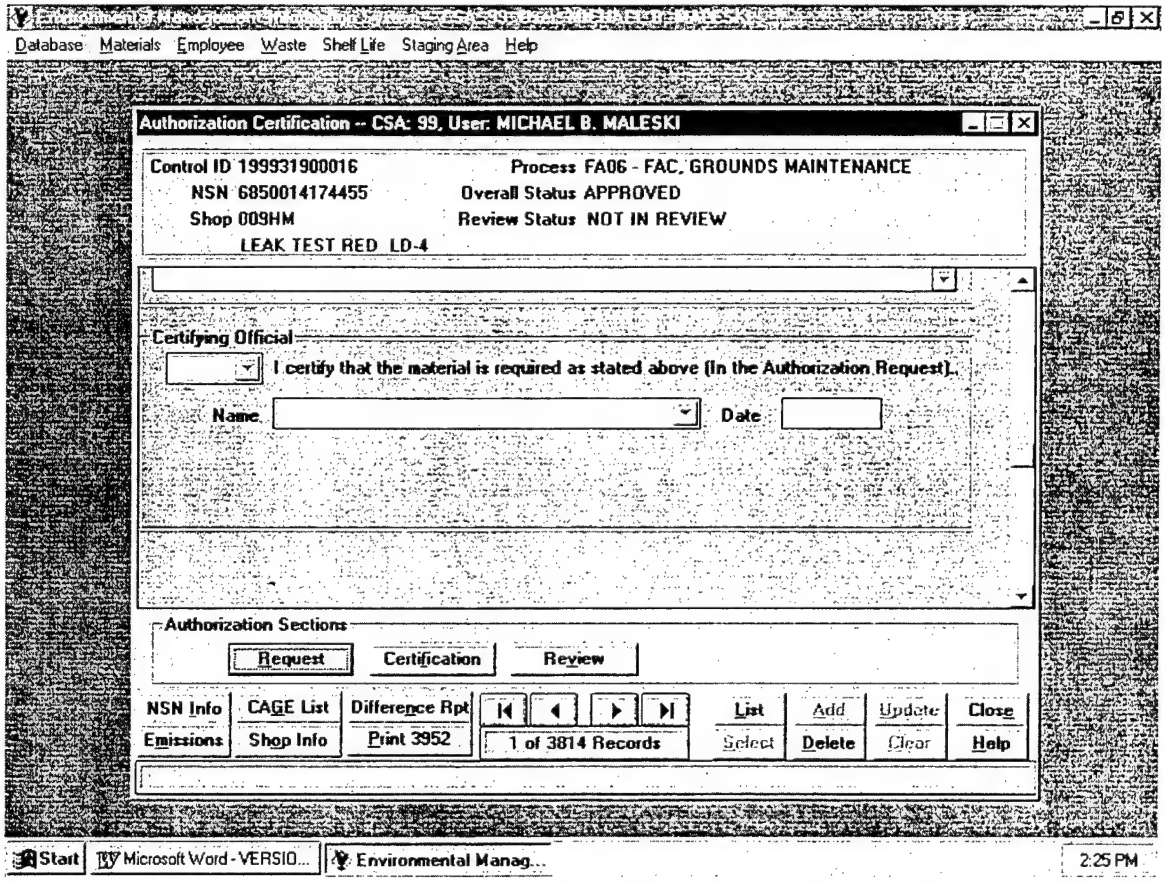

FIGURE 7.16
AF-EMIS AUTHORIZATION REVIEW RECORD SCREEN NUMBER 1 OF 5

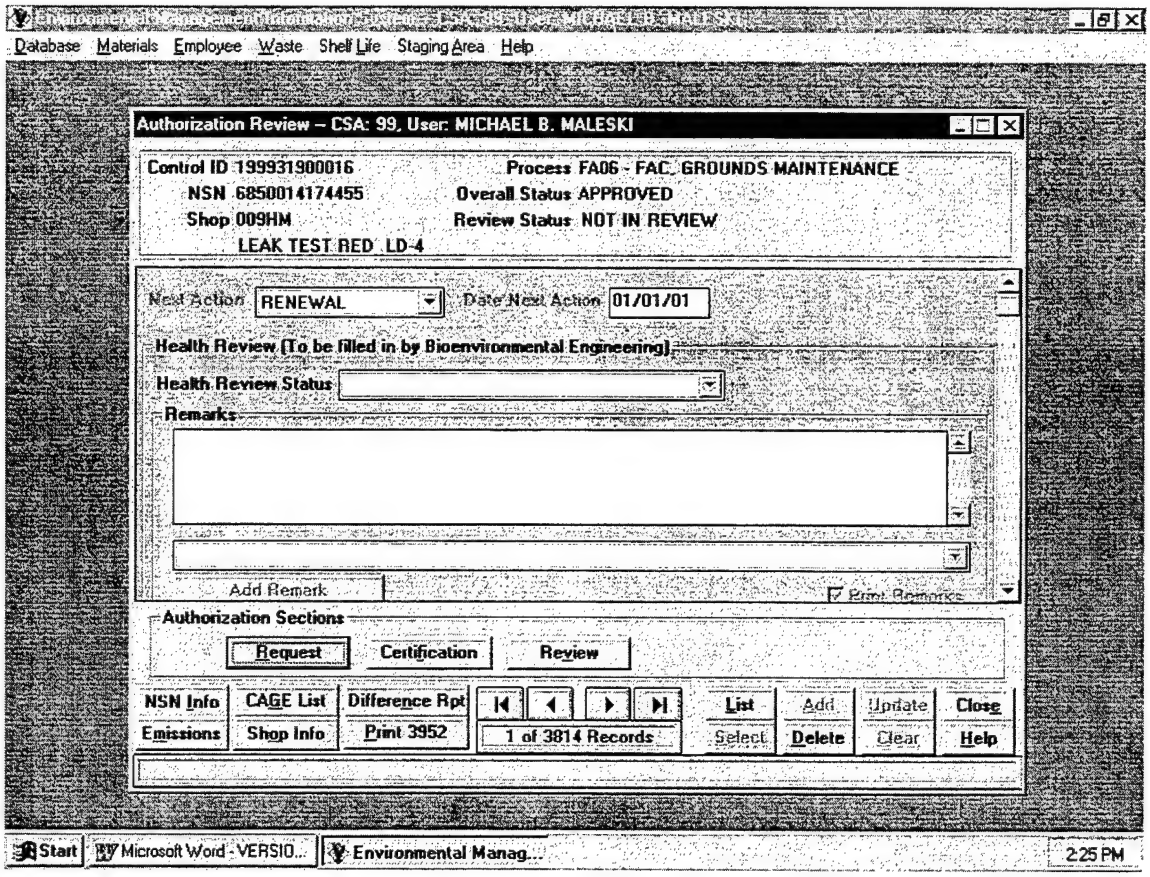

FIGURE 7.17
AF-EMIS AUTHORIZATION REVIEW RECORD SCREEN NUMBER 2 OF 5

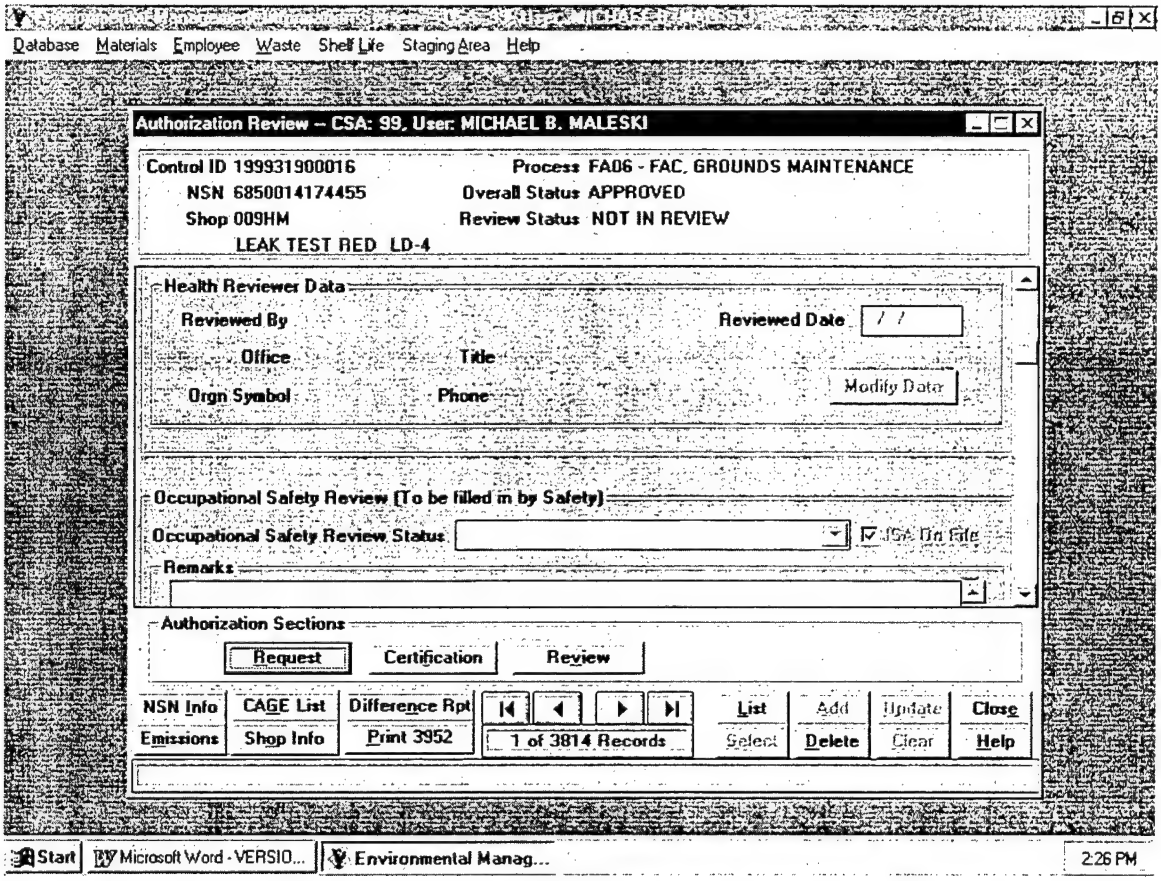

FIGURE 7.18
AF-EMIS AUTHORIZATION REVIEW RECORD SCREEN NUMBER 3 OF 5

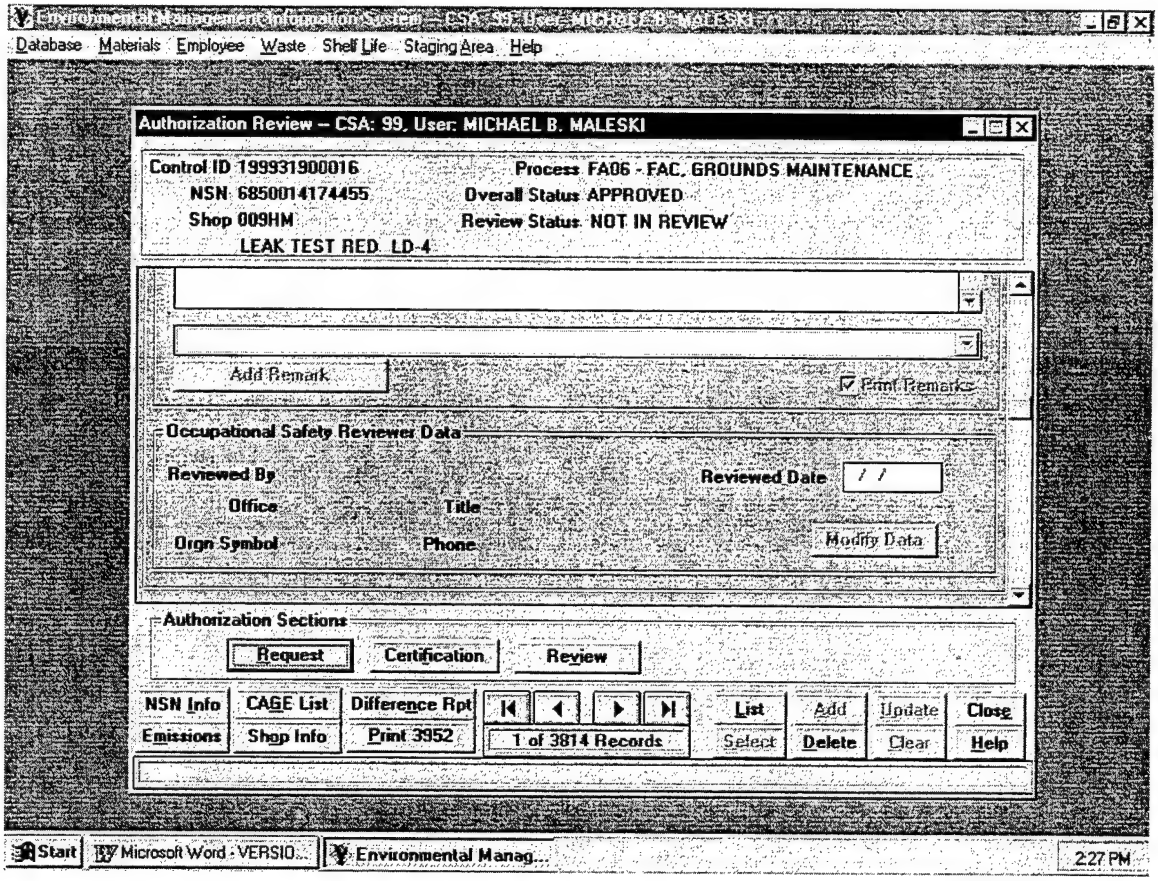

FIGURE 7.19
AF-EMIS AUTHORIZATION REVIEW RECORD SCREEN NUMBER 4 OF 5

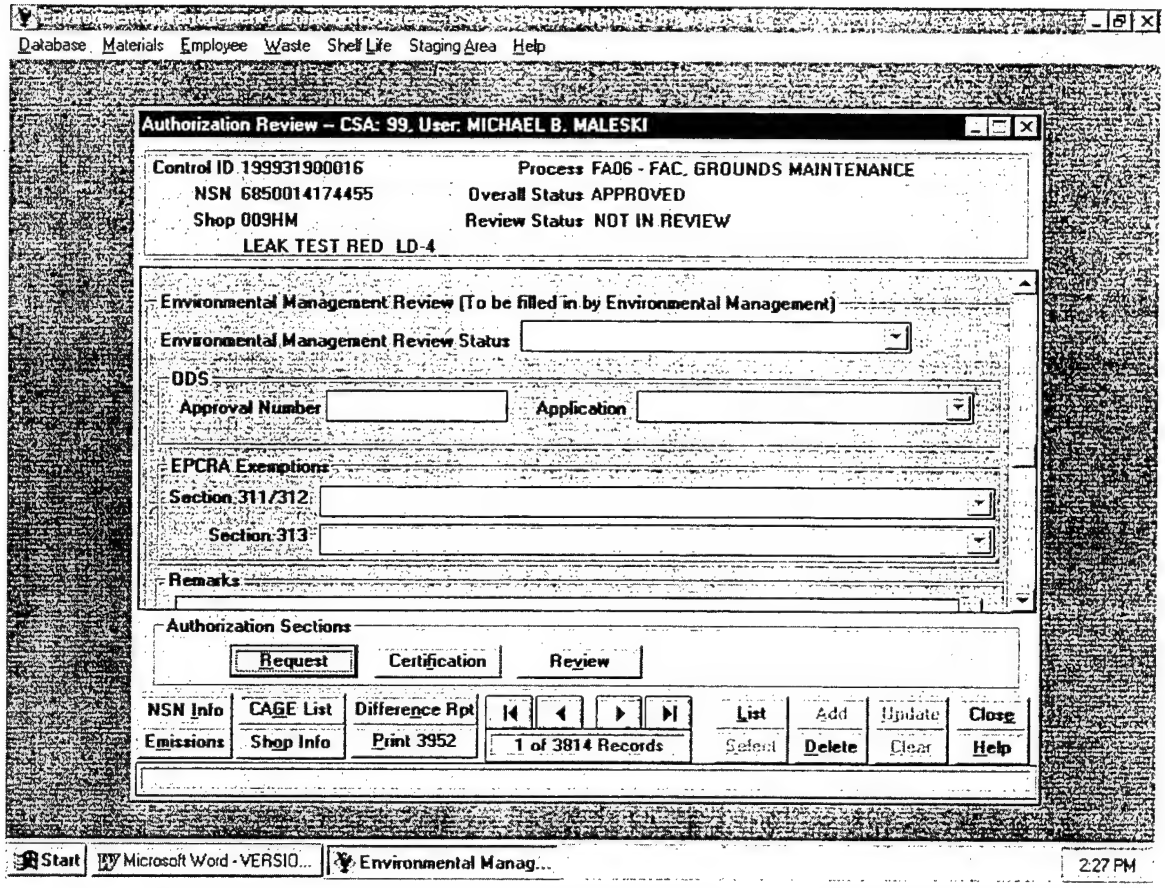

FIGURE 7.20
AF-EMIS AUTHORIZATION REVIEW RECORD SCREEN NUMBER 5 OF 5

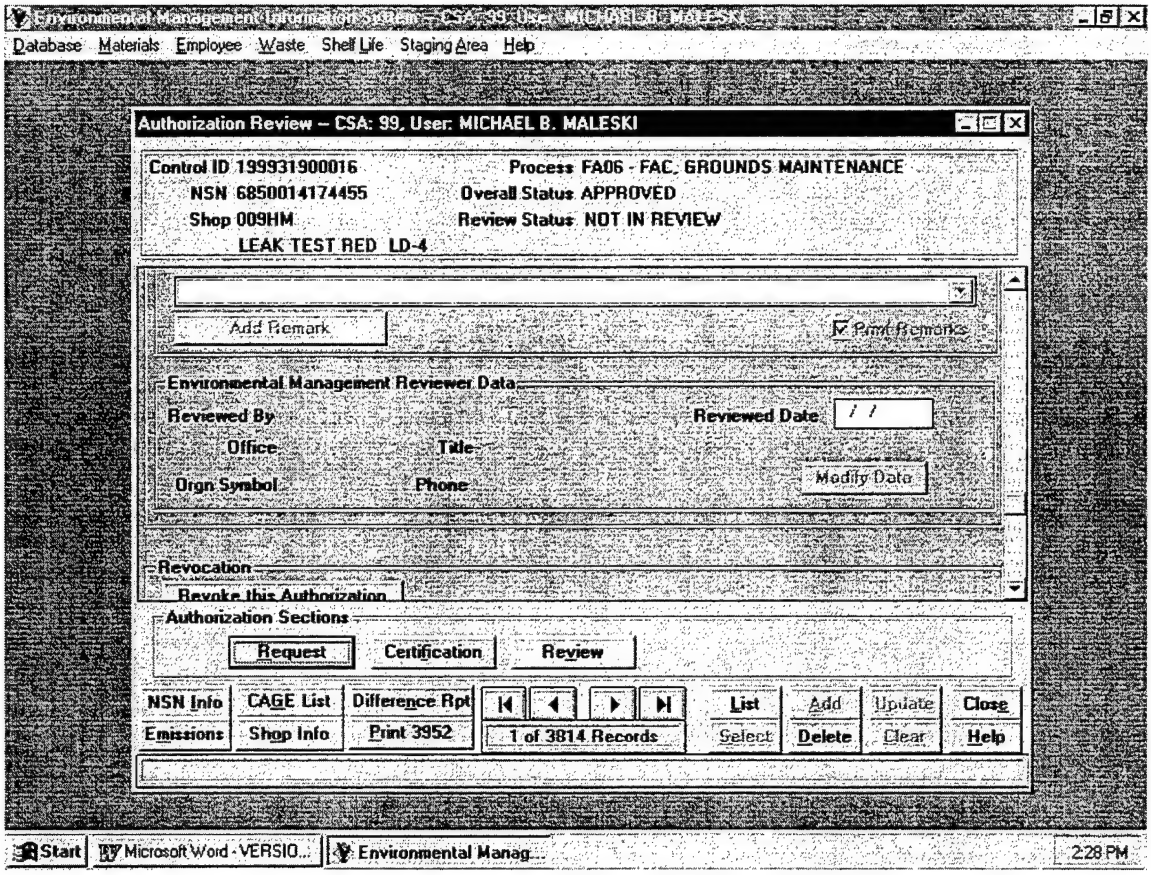

Table 7.1. Authorization Record Data Fields with Sources of Information and Number of PES Entries

Data Field	Source of Information	Number of PES Entries
Type of Use	Form 3952 / AARW*	260
End Date	Form 3952 / AARW*	0
Shop Code	Form 3952 / AARW*	260
Contractor Shop	Form 3952 / AARW*	0
Supply Account Codes	Form 3952 / AARW*	310
NSN	Form 3952 / AARW*	243
Draw Amount	Form 3952 / AARW*	260
Draw Frequency	Form 3952 / AARW*	260
Sole Source Requirement	Form 3952 / AARW*	0
Sole Source CAGE	Form 3952 / AARW*	0
Justification - Weapon System	Form 3952 / AARW*	28
Justification - Justification (Tech. Order)	Form 3952 / AARW*	168
Justification - Requiring Document	Form 3952 / AARW*	164
Justification - Page Number	Form 3952 / AARW*	91
Justification - Para. Number	Form 3952 / AARW*	92
Justification - Date	Form 3952 / AARW*	42
Justification - Revision	Form 3952 / AARW*	41
Justification - Remarks	Form 3952 / AARW*	0
New Process?	Form 3952 / AARW*	259
New Material?	Form 3952 / AARW*	259
Authorization Replace Another?	Form 3952 / AARW*	2
ID for Replaced Authorization	Form 3952 / AARW*	2
Authorization Replacement Reason	Form 3952 / AARW*	2
Process Code	Form 3952 / AARW*	260
Task Description	Form 3952 / AARW*	257
Task Duration with Units	Form 3952 / AARW*	256
Task Frequency with Units	Form 3952 / AARW*	256
Amount of Material Used per Task with Units	Form 3952 / AARW*	249
Material Application Method	Form 3952 / AARW*	155
PPE Type	HMIS / MSDS / Form 3952 / AARW*	361
Personal Protective Equipment (PPE)	HMIS / MSDS / Form 3952 / AARW*	361
PPE Remarks	HMIS / MSDS / Form 3952 / AARW*	0
PPE - Respirator Manufacturer (Required with Respirator Only)	HMIS / MSDS / Form 3952 / AARW*	30
PPE - Respirator Model (Required with Respirator Only)	HMIS / MSDS / Form 3952 / AARW*	30
PPE - Respirator Cartridge Type (Required with Respirator Only)	HMIS / MSDS / Form 3952 / AARW*	30
PPE - Respirator TC Number	HMIS / MSDS / Form 3952 / AARW*	9
Is Process Performed in Facility, Aircraft, or Other Structure?	Form 3952 / AARW*	260
Is Process Performed Outdoors?	Form 3952 / AARW*	7
Is Process in a Small or Restricted Space?	Form 3952 / AARW*	0
Is Process Performed in a Confined Space?	Form 3952 / AARW*	0
Will Process be Performed in a Location other than the Shop?	Form 3952 / AARW*	0
Description of Process Location (Building number, etc.)	Form 3952 / AARW*	0
Where Will Any Unused Material Be Stored?	Form 3952 / AARW*	0

Table 7.1 (Concluded)

Data Field	Source of Information	Number of PES Entries
Industrial Equipment Use	Form 3952 / AARW*	0
Equipment Type	Form 3952 / AARW*	0
Equipment Number	Form 3952 / AARW*	0
Material Transfer Method	Form 3952 / AARW*	260
Is Material Mixed?	Form 3952 / AARW*	260
Material Mixing Method	Form 3952 / AARW*	0
Is Material Heated?	Form 3952 / AARW*	260
Material Heating Method	Form 3952 / AARW*	0
Heated Material Temperature Min., Max., and Units	Form 3952 / AARW*	0
Material Abrasion Method	Form 3952 / AARW*	260
Is Material Pressurized?	Form 3952 / AARW*	0
Material Pressurization Method	Form 3952 / AARW*	0
Material Pressure Min., Max., and Units	Form 3952 / AARW*	0
Are Engineering Controls in Use?	Form 3952 / AARW*	241
Engineering Control Type	Form 3952 / AARW*	220
Waste Handling Method	Form 3952 / AARW*	257
Name of Requestor	Form 3952 / AARW*	257
Request Data	Form 3952 / AARW*	257
Is Authorization Request Certified?	Form 3952 / AARW*	257
Name of Certifier	Form 3952 / AARW*	257
Certified Date	Form 3952 / AARW*	257
Certifier Remarks	Form 3952 / AARW*	257
Next Action	Form 3952 / AARW*	257
Date Next Action	Form 3952 / AARW*	257
Health Review Status	Form 3952 / AARW*	256
Health Review Remarks (General)	Form 3952 / AARW*	256
Health Review Remarks (Canned)	Form 3952 / AARW*	0
Health Review Date	Form 3952 / AARW*	256
Health Review Person	Form 3952 / AARW*	256
Safety Review Status	Form 3952 / AARW*	256
Safety Review Remarks (General)	Form 3952 / AARW*	256
Safety Review Remarks (Canned)	Form 3952 / AARW*	0
Safety Review Date	Form 3952 / AARW*	256
Safety Review Person	Form 3952 / AARW*	256
Environmental Management (EM) Review Status	Form 3952 / AARW*	256
EM Review Remarks (General	Form 3952 / AARW*	256
EM Review Remarks (Canned)	Form 3952 / AARW*	0
EM Review Date	Form 3952 / AARW*	256
EM Review Person	Form 3952 / AARW*	256

*AARW - Add Authorization Request Worksheet.

After the Authorization Request is entered, it appears in a series of electronic queues or "in boxes" of the organizations that must certify or review the authorization. These organizations include, but are not limited to, the Shop, BE, CE, and SE; other organizations can be added to the review cycle and the order of review can be altered through the System Administration Module. The Shop appears in the queue for certification only. The Authorization Request only appears in the queue under a specific AF-EMIS Menu for certain database users that are given reviewing rights for certain organizations. Both the reviewing rights and the organizations are assigned using the System Administration Module. For instance, "BE Reviewer Number 1" is given reviewing BE privileges in AF-EMIS. The "BE Reviewer Number 1" is only allowed to view and review Authorization Requests that are in the BE queue. The designated reviewers know that a request is in their queue by logging into AF-EMIS and checking under the AF-EMIS Menus: 1) Materials; 2) Authorization Work Flow; and then 3) the specific reviewing organization. Reviewers should check their queues at certain intervals, perhaps once per week, to allow for timely review of authorization requests.

Returning to the flow of the Authorization Request, it moves to the first queue (certification by Shop) for certification. After the reviewer has reviewed the data loaded into the Add Authorization Requests screens, he/she should either enter Yes or No when asked if the Authorization is certified or not. If it is certified, the Authorization Request moves to the review queues (BE, SE, then CE, etc.). If it is not certified, the Authorization Request Work Flow is terminated. Regardless, the reviewer's name automatically appears in the "Reviewed By" Data Field since they are logged into the system. This feature acts as a "signature" on a Form 3952. After (if) the Authorization Request is reviewed and approved by all reviewing organizations, the Authorization Record is now complete and the Shop can have the authorized material issued to them. If, after the review cycle is over, a hard copy of a Form 3952 is needed for the authorization, one can be printed from the AF-EMIS database.

The second option does not include the electronic queue process of the Authorization Work Flow option. This option is called "Authorized Simple" process. It is identical to the Authorization Work Flow option except one person enters and certifies an Authorization Request while another person performs all of the reviews. The third option, the "Simple" process, allows for one person to enter, certify and review an Authorization Request. The advantage of "simple" option is that a Base can retain the process of filling out and reviewing hard copy Form 3952s and one person can enter all of the data.

Andrews AFB is utilizing the Authorization Simple option. However, Shop personnel will not be entering Authorization Request information into AF-EMIS; other designated Base personnel are assigned this task. Shop personnel will provide these designated Base personnel with a hard copy of an Add Authorization Request Worksheet, which mirrors the Authorization Request screens in AF-EMIS.

As discussed in Section 1.3, PES found over 3,800 Authorization Records in the AF-EMIS database. At the conclusion of PES' data entry activities, there were 285 Authorization Records completely updated/validated by PES at Andrews AFB. An additional 3,515 Add Authorization Request Worksheets need to be completed by Shops before the Authorization Records for all materials issued in the past two years can be completely updated. It is possible that the remaining 3,515 worksheets noted above will decrease if the Shops no longer need some materials that were issued in the past.

While PES was performing data entry, the authorization configuration was set to "Authorized Simple". This allowed the PES team to electronically "certify" and "review" each authorization that had an approved hard copy Form 3952.

One advantage of obtaining new Add Authorization Request Worksheets at Andrews AFB is that old versions of Form 3952s do not include every data field that is required to be populated in the AF-EMIS Authorization Record. This did prove to be a significant disadvantage for the "old" Form 3952s as PES could not populate the new required, additional data fields. Therefore, PES did not change the existing approved Authorization Record. This strategy was adopted because any change to an existing record requires all the additional data fields to be populated. Since PES was not provided the required information, no value could be added to the database.

Populating the Authorization Record is the last step in entering/validating authorized materials in AF-EMIS. Because the authorized NSN and shop numbers have been established to create the NSN and Shop Records, respectively, these numbers were available for entry into/validation of the Authorization record.

Type of Use. The Type of Use pick-list data field provides three options: one-time, limited, and recurring. The one-time option is for authorized materials that will be obtained/used once; if the material is needed again, a new authorization must be completed. The recurring option is for materials that are required continuously at specified intervals (i.e., two cans per week). The limited option was not needed.

This data field was populated or validated using data from the Form 3952 or Add Authorization Request Worksheet. The majority of authorizations at Andrews AFB are "recurring".

End Date. This data field must be filled in if the Type of Use Data Field is populated with "One-Time" or "Limited". It specifies the expiration date of the authorization. If "Recurring" is selected during an Add Authorization Request, this data field does not appear; it is set-up by default to expire one year from

initial data entry. The Date Next Action Data Field, which is discussed later in this section, can be changed to revise the one-year expiration.

Shop Code. This data field identifies the shop that is authorized to use the specific material. The shop code was obtained from the Form 3952 or the Add Authorization Request Worksheet. This data field required population only for new authorizations.

Contractor Shop. This field is used to declare if a shop is operated by a contractor. There were no shops at Andrews AFB that were exclusively operated by a contractor where PES updated Authorizations records.

Supply Account Code. This data field represents the supply account(s) that each Shop is provided to procure materials. When the shop code is selected, the Supply Account Code pick-list data field (actually a separate window) will appear. The pick-list contains a list of all supply account codes that are assigned to the shop in the Shop Record. Since the purpose of AF-EMIS is to regulate the use of hazardous materials for a specific shop and not supply accounts within a shop, all supply account codes assigned to a shop were selected for the Authorization Record. PES entered 310 supply account codes.

NSN. The NSN data field was entered or validated from data on the Form 3952 or Add Authorization Request Worksheet.

Draw Amount and Draw Frequency. These data fields represent the quantity of material a shop is authorized to be issued over a given period of time, e.g., two cans per week. These data fields were typically populated incorrectly. PES populated these data fields with revised data 260 times.

The Draw Frequency field is a pick-list consisting of the following time periods: daily, weekly, monthly, quarterly, semi-annually, annually, greater than annually, and one-time only. If the frequency shown on the Form 3952 or Add Authorization Request Worksheet did not match any of the pick-list frequencies, PES entered a draw amount and frequency that was equivalent to the value on the Form 3952 or Add Authorization Request Worksheet (e.g., four cans per week would be entered for eight cans bi-weekly).

Sole Source Requirement and Sole Source CAGE. The Sole Source Requirement (Yes/No options) and Sole Source CAGE data fields are used, if desired, to specify a specific CAGE (manufacturer) of the material being requested. If a specific material manufacturer is required, "Yes" is selected for Sole Source Requirement and the CAGE code is selected from the Sole Source CAGE pick-list. No such requirements were necessary at Andrews AFB.

Justification – Weapon System. This data field indicates any weapon systems that require the use of the particular HAZMAT. A pick-list containing codes was used to populate this data filed. Less than one-quarter of all justifications created had a weapon system specified, usually specified in the title of the Technical Order.

Justification – Justification. The justification data field is a pick-list containing the type of document that contains the justification for the use of the HAZMAT. Typically, the justification was either a Technical Order or Manufacturer's Manual.

Justification – Requiring Document. This pick-list contained specific titles of justifications specified under the justification data field. If a specific title was not on the pick-list, the system administration module was used to add the title to the appropriate base-maintained table.

Justification – Page Number, Paragraph Number, Date, and Revision Number. These data fields represent the page number, paragraph number, date and revision number of the exact justification specified under the Requiring Document Data Field. This data, along with all justification data, was specified on the Form 3952 or Add Authorization Request Worksheet.

New Process. This data field is a simple yes or no question regarding if the process is new for the shop. "No" was selected for all.

New Material. This data field is the same as the New Process data field except it pertains to a new material. PES selected "No" for all authorizations.

Will This Authorization Replace Another Authorization (Different Process or Material)?. This data field asks if the Authorization Record is replacing another due to a change in process code or material. If an Authorization is being replaced, the Control ID Data Field must be populated with the Control ID of the old Authorization Record. The Control ID is assigned by AF-EMIS when a request is generated and can be located using the Authorization Selection screen. Another data field, Replace Reason, must be populated based on options from a pick-list. It represents the reason for the authorization being replaced (e.g., changed process code, which was typical and added to the appropriate base-maintained table).

Process Code. The Process Code is a four character code (two-letters followed by two numbers) that indicates the process operations that occur in the shop, such as industrial soldering. This field was populated using a pick-list established in the Shop records.

Task Description. This is a large text box to be used to describe the material's purpose and how the material is used. PES found this data field not to be populated for all records. PES entered text for all authorizations for which the

description was included on the Form 3952 or Add Authorization Request Worksheet. Nearly all of the Form 3952s and Add Authorization Request Worksheets included some description of how the material was used.

Task Duration and Duration Units. This data field is used to reflect how long it takes to perform the task. A number is entered in the first field and appropriate units of time are chosen from a pick-list in the second field (e.g., two hours). If appropriate duration units are not available, they must be added to the appropriate base-maintained table.

Task Frequency and Frequency Units. Task Frequency is how often the task is performed. A number is entered in the first field and then units are chosen from a pick-list in the second field (e.g., one quarterly).

Amount of Material Used in Task with Units. The Amount of Material Used in Task data field is intended to estimate the amount of material that will be used in the performance of the task; however, PES found the pick-list choices offered in AF-EMIS did not always accurately reflect the true performance of the material. In some shops (e.g., Transportation Maintenance) the amount of material used varies per task. The fact that the pick-list associated with this data field is not a base-maintained table, does not allow accurate task performance characteristics to be shown.

Application Method. This data field is a pick-list that contains several material application methods. It is a base maintained table; if it does not contain the required data, it must be added through the System Administration Module.

Will Personal Protective Equipment Be Worn During This Process?; PPE Type; PPE Remarks; and PPE Respirator Manufacturer, Model, Cartridge and TC Number. This Personal Protective Equipment Section asks the question "Will PPE be worn during this process?" If the answer to the initial question is Yes, then the Personal Protective Equipment (PPE) data box appears. The PPE can

be entered/validated by clicking the "New" button located to the right of the PPE data field box. PPE was entered if needed, based on information taken from the control measures section of HMIS. The PPE section contains the data fields PPE Type, PPE and Remarks. PES discovered that the PPE Type was initially set to "unknown" as a result of the upgrade to Version 6.0. The type "Unknown" was not an option; therefore PES had to access the System Administration Module and assign the PPE type in the Base Maintained Table "PPE" (e.g., PPE Type: Hands, PPE: Nitrile Rubber Gloves).

For most PPE, the data fields PPE Type, PPE and Remarks are all that are populated; however if the PPE Type is Respirator, the Respirator Data area of the screen will appear. In this section the Respirator Manufacturer, Respirator Model, Cartridge Type, and Testing and Certification (TC) Number are entered if available.

Is the Process Performed in a Facility, Aircraft, Manhole or Other Structure?; Is the Process Performed Outdoors?; Is the Process Performed in a Small or Restricted Space?; Is the Process Performed in a Confined Space?; and, Process Location. These data fields are all yes/no questions. If the answer to the confined space data field question is Yes, then a text box appears asking for a description of the Process Location. There is also a text box at the end of this section asking where any unused material will be stored (e.g., Flammable Locker).

Will industrial Equipment be Used?, Equipment Type, Equipment Number, and Transfer Method. These data fields involve whether or not industrial equipment is used. If the answer to this question is Yes, then the Industrial Equipment data box appears. This box contains the following data fields: Equipment Type, Equipment Number, and Transfer Method. The Equipment Type and Transfer Method are selected from a pick-list (e.g., Equipment Type: Open Tanks, Transfer Method: Pumped).

Material Handling Information Data Fields (13 data fields). These data fields involve a series of questions pertaining to mixing, heating, abrading, and pressurizing of the hazardous material. These questions are asked to determine whether any of these actions will occur during the use of the material. If the answer to the Mixing question is Yes, then the data field Mixing Method appears. A specific choice can be made form a pick-list. If the answer to the Heating or Pressurizing questions is Yes, then a method must be chosen from a pick-list. In addition, minimum and maximum temperatures and/or pressures must be added along with the appropriate units of measure (i.e., pounds per square inch or pressure). Also, an abrasion method must be selected from the Abrasion Method pick-list.

Will Engineering Controls be used during the process? and Engineering Controls. The first data field is a yes/no question. If the answer to the question is Yes, then the Engineering Controls data field box appears. Clicking the "new" button can access this field. The appropriate control method can be chosen from a pick-list (e.g., Exhaust Fan).

Waste Disposal Method. The Waste Disposal Method data field is a pick-list with several options for the anticipated method of disposing of the material, such as "Consumed in Use", "Drummed/Containerized", and "Recycled Off-Site". This data field is primarily used for the method of disposal for the material, not the material's container. AF-EMIS Version 6.0 allows more than one disposal method to be added to the Waste Disposal Method data field box. PES included the container disposal method if available (e.g., "Return to Hazmat Pharmacy").

After these data fields are populated, the Authorization Request must be certified by a designated Shop Certifier. The procedure for certification for the "Authorization Work Flow" is described near the beginning of this section. However, PES "certified" authorizations in the "Simple" process. Certification of

an authorization request is done through the Authorization Selection screen when AF-EMIS is configured in the Authorization Simple Option. The Authorization Selection screen is accessed through the Materials Module by clicking on Authorization. Once at the Authorization Selection screen, the NSN and Shop Code were inputted, the Overall Status data field was changed to empty, and the Select button was clicked. Once the Authorization Record has been located, the Certification button was selected. If AF-EMIS is configured in the Authorization Workflow option, the certifier can access the certification screen from the Materials Module by clicking on Authorization Work Flow, then Certify Request.

The Certification screen contains data fields for the Requestor and Certifier as well as a large text box for comments. The Requestor data field is automatically populated with the AF-EMIS user's log-on ID. The certifier name can be selected from a pick-list. Adding a Shop Certifier is done on page 2 of the Shop Record screen. A name can be added to the list by clicking on the "Shop Certifier" button, then click New and add the desired information.

PES designated itself as both Shop Requestor and Shop Certifier then added the following comment: "PES updated data as provided by Andrews AFB, data was requested by "Name (if available)", Phone, Date. PES updated data as provided by Andrews AFB, data was certified by "Name (if available)", Phone, Date."

After the Authorization Request is certified, it must be reviewed by the reviewing organizations. Review of an Authorization request was done through the Authorization Selection screen as AF-EMIS was configured in the Authorized Simple process for PES' data entry efforts. The Authorization Selection screen was accessed through the Materials Module by clicking on Authorization. Once at the Authorization Selection screen, the NSN and Shop Code was entered, the Overall Status data field changed to empty, and the Select button clicked. Once

the Authorization Record was located, the Review button was selected. If AF-EMIS is configured in the Authorization Workflow option, the Reviewer can access the authorizations waiting for their review from the Materials Module by clicking on Authorization Work Flow, then choosing the appropriate reviewing organization.

The Review screen contains several data fields for a representative from BE, Safety, and CE (Environmental Management) to review/approve the request and enter any remarks that pertain to the approval in progress. PES designated itself as the Health, Safety, and Environmental reviewer then added the following comment to the remarks field of each reviewing organization: "PES updated data as provided by Andrews AFB, data was certified by "Name (if available)", Phone, Date."

8.0 FINAL AF-EMIS STATUS

This section summarizes the final overall status of AF-EMIS at Andrews AFB after completion of data entry. In addition, remaining data gaps and issues are discussed, including proposed resolutions.

At completion of the data entry on 28 April 2000, there were 2,247 different authorized HAZMATs in the Base AF-EMIS database with either a NSN or LPN; 1,501 were items with a NSN and 746 were locally purchased items that were identified with a LPN. PES completely updated the NSN record for 1,321 of these 2,247 different materials. The remaining 926 NSN Records (2,247 minus 1,321) were not fully updated for various reasons. Twenty-four materials required the size of the issued container since Fedlog, HMIS, an MSDS or a Form 3952 did not identify the correct size of the issued container. There were 13 materials that did not have a MSDS; therefore, the physical hazard could not be verified versus the MSDS. Fifty-six NSN records were inactivated since the NSN was replaced by another NSN. Eight other HAZMAT items did not have a NSN assigned; therefore, no NSN record could be located or loaded. The remaining 825 NSN records were not updated/validated because there was no Form 3952 on file (approximately 27%) or the eight-week data entry period expired (approximately 73%).

PES also populated/validated 1,662 of the 2,450 CAGE Records. PES could not populate the CAGE Records for 13 stock items (including local purchases) because there were no MSDS for them and PES could not find the items in HMIS. However, PES suspects that some of the stock numbers or CAGE numbers of these materials may be incorrect. For instance, some of these stock numbers (NSNs) could be found in Fedlog. It is possible that a clerical error was made when Base personnel entered the stock number onto the Form 3952 and AF-EMIS. This was definitely the case in a few instances as the correct stock numbers were found for some incorrect NSNs entered onto Form 3952s. The

same could be possible for CAGE numbers as well. Base personnel should review the Form 3952s of these suspect stock numbers with the Shop point of contact to verify the stock number and/or obtain a MSDS.

PES also could not populate the CAGE Records for the 24 materials that were lacking container size data for NSN Record purposes. The remaining CAGE records were not completed for the same reason as their associated NSN records.

PES completely populated 285 Authorization Records for which new Form 3752s were recently submitted. An additional 3,515 Add Authorization Request Worksheets need to be completed by Shops before the Authorization Records for all materials issued in the past two years can be completely updated. It is possible that the remaining 3,515 worksheets noted above will decrease if the Shops no longer need some materials that were issued in the past.

PES submitted an Excel spreadsheet to Base personnel that lists each shop and their authorized HAZMATs. Notes were included for each HAZMAT on the spreadsheet. These notes indicated the status of each type of AF-EMIS record (i.e., NSN, CAGE, etc.) with respect to each shop's authorized HAZMAT. Additional notes described deficiencies for each shop-specific authorized HAZMAT, such as the container size is needed or if a MSDS is needed. Included in this spreadsheet was a master list of materials requiring a MSDS and/or shop input.

PES developed the spreadsheet to monitor and document its data entry progress. It was submitted to the Base to aid CE, BE, and LG personnel in filling the few data gaps that require information not available to PES during its onsite work. It also will be helpful in maintaining the database.

PES recommends the following activities to improve the overall quality of the Andrews AFB AF-EMIS database:

- Base staff should be assigned to inputting new Authorization Requests and updating their Form 3952 to the most current version that is compatible with AF-EMIS Version 6.1. In addition, hard copies of newly created Authorization Records (Form 3952s) should be printed from AF-EMIS and given to the Shop POC when a newly authorized material is issued to a Shop for the first time. The Shop POC should initially review these forms to verify the information and periodically review them to identify materials that are no longer being used. He/She should advise the person(s) responsible for maintaining AF-EMIS so that the Authorization Record can be inactivated.

- Missing information needed to completely update the Base AF-EMIS database as identified in this report should be collected and entered by the appropriate Base staff. Alternatively, a contractor should be retained for this purpose. One of the greatest needs relates to the Authorization Record. The Version 6.1 update of AF-EMIS requires considerably more data than is captured on the Form 3952. A significant effort will be required to develop this information. The Shops which will be the ultimate source of this information will require assistance in understanding and providing the needed data.

- A contractor should be used to conduct semi-annual audits of the AF-EMIS database and to update it as necessary. This activity would help ensure that the benefits of the major update performed by PES is not lost. It would also provide an assessment of how well the database is being maintained.

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APPENDIX A

ADD AUTHORIZATION REQUEST WORKSHEET

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AF-EMIS Authorization Request Worksheet

TYPE OF REQUEST:
(circle one) LIMITED ONE-TIME RECURRING

END DATE: _____
(required for Limited & One-Time uses)

SHOP INFORMATION

SHOP CODE: _____

SUPPLY ACCOUNT(S): _____
(optional)

MATERIAL INFORMATION

NSN/LSN: _____

DRAW INFORMATION
DRAW AMOUNT: _____ DRAW FREQUENCY: (circle one) ANNUALLY, DAILY, GREATER THAN YEARLY, MONTHLY ONE TIME ONLY, QUARTERLY, SEMI-ANNUALLY, WEEKLY

SOLE SOURCE INFORMATION
DOES THIS PROCESS INVOLVE A SOLE SOURCE REQUIREMENT? (circle one) YES NO
SOLE SOURCE MANUFACTURER NAME OR CAGE: _____ SOLE SOURCE PART NUMBER/TRADE NAME: _____

JUSTIFICATION/REQUIRING DOCUMENT
IS THERE A TECHNICAL ORDER OR OTHER DOCUMENT JUSTIFYING THE USE OF THE REQUESTED MATERIAL? (circle one) YES NO

JUSTIFICATION	REQUIRING DOC	PAGE#	PARA	REVDATE	REV	WEAPON SYS	REMARKS

PROCESS INFORMATION
IS THIS REQUEST FOR A NEW WORKLOAD OR PROCESS IN THIS SHOP? (circle one) YES NO

IS THIS REQUEST FOR A NEW MATERIAL FOR THE SHOP? (circle one) YES NO

WILL THIS AUTHORIZATION REPLACE ANOTHER AUTHORIZATION (DIFFERENT PROCESS OR MATERIAL)? (circle one) YES NO

IF YES, ENTER THE CONTROL ID FOR THE AUTHORIZATION BEING REPLACED: _____

REPLACE REASON: (optional) _____

AF-EMIS PROCESS CODE: _____

TASK INFORMATION
TASK DESCRIPTION (fully describe work activity and process in which this material is used):

DURATION OF TASK: _____ FREQUENCY OF TASK: _____

AMOUNT OF MATERIAL USED PER TASK: _____ (specify units if other then unit of issue)

APPLICATION METHOD: (circle only one)
BRUSH - SPRAY - APPLICATOR - SPATULA/PUTTY KNIFE - CLOTH - ROLLER - PARTS WASHER
DIPPING - POURING - SQUEEZE BOTTLE - HOSE (NO SPRAY) - SPRAY GUN/NOZZLE - VAPOR CONDENSATION - NOT APPLIED

TASK CODE(S): (optional) _____

1

PERSONNEL EXPOSUR

NUMBER OF PERSONNEL INVOLVED IN THIS TASK: (optional) _____

EXPOSURE TIME (in Secs: optional) _____

SHIFT TIME (If other than 8hr: optional) _____

WOULD SKIN CONTACT OCCUR WITHOUT THE USE OF PPE? (circle one) YES NO

IF YES,WHERE WOULD SKIN CONTACT OCCUR WITHOUT PPE: (circle those that apply)
FACE EYES HANDS TORSO WHOLE BODY

PERSONAL PROTECTIVE EQUIPMENT (PPE)

WILL PERSONAL PROTECTIVE EQUIPMENT BE WORN DURING THIS PROCESS? (circle one) YES NO

PPE TYPE	PPE	RESPIRATOR MANUFACTURER	RESPIRATOR MODEL	RESPIRATOR CARTRIDGE TYPE	RESPIRATOR TC#
BODY - FACE - FEET - HANDS RESPIRATOR - TORSO - HEAD					
BODY - FACE - FEET - HANDS RESPIRATOR - TORSO - HEAD					
BODY - FACE - FEET - HANDS RESPIRATOR - TORSO - HEAD					
BODY - FACE - FEET - HANDS RESPIRATOR - TORSO - HEAD					

LOCATION INFORMATION

WILL THE PROCESS BE PERFORMED IN: (check all that apply)

☐ A FACILITY, AIRCRAFT, EQUIPMENT, MANHOLE OR OTHER STRUCTURE

☐ OUTDOORS ☐ SMALL OR RESTRICTED SPACE ☐ CONFINED SPACE

WILL THE PROCESS BE PERFORMED IN A LOCATION OTHER THE THAN SHOP? (circle one) YES NO
If yes, write a description of the Process Location (building number, etc.) _____

WHAT IS THE STORAGE LOCATION FOR UNUSED MATERIAL? _____

INDUSTRIAL EQUIPMENT:

WILL INDUSTRIAL EQUIPMENT BE USED?(circle one) YES NO

EQUIPMENT TYPE	EQUIPMENT NO (optional)	TRANSFER METHOD
CLOSED TANKS		NOT TRANSFERRED - POURED - PUMPED
LIQUID TIGHT EQUIPMENT		NOT TRANSFERRED - POURED - PUMPED
MECHANICAL EQUIPMENT		NOT TRANSFERRED - POURED - PUMPED
OPEN TANKS		NOT TRANSFERRED - POURED - PUMPED
SPRAY BOOTH		NOT TRANSFERRED - POURED - PUMPED
VAPOR DEGREASER		NOT TRANSFERRED - POURED - PUMPED

HANDLING INFORMATION

WILL THE MATERIAL BE MIXED WITH ANOTHER SUBSTANCE OR SUBSTANCES? (circle one) YES NO

MIXING METHOD: (circle only one)
NOT MIXED - HAND - STIRRED - OPEN CONTAINER MIXER - CLOSED CONTAINER MIXER

WILL THE MATERIAL BE HEATED DURING THE PROCESS? (circle one) YES NO

HEATING METHOD:
NOT HEATED - OVEN - SOLDERING IRON - TORCH

MIN WORKING TEMP _____

MAX WORKING TEMP _____

TEMP. UNITS (°F/°C) _____

ABRASION METHOD:
NOT ABRADED - WIRE BRUSH - SANDER - GRINDER

WILL THE MATERIAL BE PRESSURIZED DURING THE PROCESS? (circle one) YES NO

PRESSURIZATION METHOD:
NOT PRESSURIZED - AIRHOSE - HAND PUMP

MIN WORKING PRESS _____

MAX WORKING PRESS _____

PRESS. UNITS _____

ENGINEERING CONTROLS

ENGINEERING CONTROLS IN USE DURING THE PROCESS: (circle all that apply)
CANOPY HOOD - COOLING COIL - COVERED TANK - ENCLOSURES - EXHAUST VENTILATION SYSTEM - NONE - PAINT BOOTH

WASTE GENERATED DURING PROCESS

DESCRIBE THE METHOD OF DISPOSAL FOR THE WASTE THAT IS GENERATED: (circle all that apply)
AIR EMISSION - BULK CONTAINER - CONSUMED IN USE - DRAINED TO INDUSTRIAL WASTE TREATMENT PLANT (IWTP)
INDUSTRIAL WASTE TREATMENT PLANT (IWTP) - DRUMMED/CONTAINERIZED - RECYCLED ON-SITE - RECYCLED OFF-SITE
OTHER - REUSED - DRAINED TO SANITARY SEWER - TRASH/MUNICIPLE WASTE

WASTE ACCUMULATION POINT: (optional) _____

WASTE NSN: (optional) _____

WASTE PROFILE: (optional) _____

END ITEM (If other than a weapon system: optional): _____

REMARKS (provide any additional information)

REQUESTOR

REQUESTOR'S NAME: _____

I certify that the material will be used as stated above.

TITLE: _____

OFFICE/ORG SYMBOL: _____

TELEPHONE #: _____

DATE: _____

CERTIFIER

CERTIFIER'S NAME: _____

I certify that the material is required as stated above.

TITLE: _____

OFFICE/ORG SYMBOL: _____

TELEPHONE #: _____

DATE: _____

3